

# MODERN PLASTICS



AUGUST 1948

**D**UREZ phenolic plastics have a spread of properties that make them ideal for unlimited industrial and resale products. Some are shown in these six highly successful applications. Each of them is unrelated to the others in the combination of mechanical, electrical, and chemical values the manufacturer required. One or more of these materials may well match your needs today.

Our continuing plant expansion, perfected quality controls, and enlarged testing facilities are reflected in the increasing use of Durez for improved, redesigned, or all-new products. If you want to know what other manufacturers are accomplishing with Durez, let us send you *Durez Plastics News* each month without charge.

## 6 WAYS TO COMPLETE THE STATEMENT—

*Export Agents: Omni Products Corp., 460 Fourth Avenue, New York 16, N. Y.*

**"Our products need..."**

**LOW-COST PRODUCTION** Excellent moldability is a cost-reducing characteristic of all Durez compounds. Here a general-purpose compound with every requisite . . . light weight, self-insulation, and attractive surface lustre . . . is used for a one-piece radio housing.

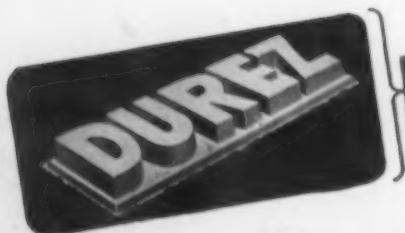
**ELECTRICAL STRENGTH** Automotive distributor caps are among the many applications requiring the high electrical resistance of this Durez group.

**IMPACT STRENGTH** In heavy-duty industrial applications such as telephones, camera cases, and machine parts, Durez combines mechanical strength with excellent wear resistance.

**HEAT RESISTANCE** Use of Durez for welding-gun housings demonstrates the efficacy of the heat-resistant phenolic compounds.

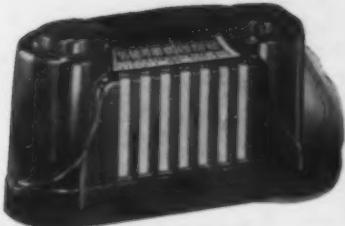
**CHEMICAL RESISTANCE** High resistance to alcohol, solvents, and many other chemicals makes certain types of Durez best for closures and other packaging applications.

**SPECIAL PROPERTIES** Success in rayon processing equipment parts, acid pump impellers, automotive water pumps, and marine pump housings suggests consideration of Durez wherever special properties are needed.



PHENOLIC RESINS →

- MOLDING COMPOUNDS
- INDUSTRIAL RESINS
- PROTECTIVE COATING RESINS



### LOW-COST PRODUCTION



### ELECTRICAL STRENGTH



### IMPACT STRENGTH



### HEAT RESISTANCE



### CHEMICAL RESISTANCE



### SPECIAL PROPERTIES

**PHENOLIC PLASTICS that fit the job**

With  
It costs  
tool-up  
you get  
in both  
Catal-  
ful phe-  
consum-  
non-in-  
cold wa-  
chemi-  
propert-  
The  
years ag-  
Catalin-  
have co-  
to use t-  
extensive  
and des-  
new ma-  
yet to fi-  
site be-



TECHNOLOGY DEPARTMENT

With *Catalin*... Costs, Too, Enjoy Clean Shaves!

It costs less . . . considerably less . . . to tool-up for Catalin cast phenolics. And, you get more . . . considerably more . . . in both eye appeal and sales appeal.

Catalin, the richest and most colorful phenolic, is as physically fit as it is consumer-persuasive. Catalin is strong, non-inflammable, unaffected by hot or cold water, and possesses outstanding chemical, electrical and mechanical properties.

The Rubberset Company, many years ago, pioneered the adoption of Catalin-handled Shaving Brushes—and have continued right up to the present to use this most beautiful of plastics—extensively! Through all these years, and despite the introduction of so many new materials, this manufacturer has yet to find anything to match the exquisite beauty and practical utility of

Catalin! . . . A regard that is now shared by many other prominent names in American industry.

Call in a Catalin plastics engineer . . . proper beforehand guidance insures you important economies. Or write today to our Cast Division for your copy of the new Catalin Catalog — a profusely illustrated and valuable compilation of Catalin materials and specifications for design engineers and manufacturers.



PUBLIC LIBRARY

AUG 11 1948

DETROIT

Brush n' Stand Sets,  
pictured here through  
the courtesy of the  
Rubberset Company.

CATALIN CORPORATION OF AMERICA  
ONE PARK AVENUE, NEW YORK 16, N.Y.

# MODERN PLASTICS\*

VOLUME 25

AUGUST 1948

NUMBER 12

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\*Reg. U. S. Patent Office.

# "Black Magic" finds an equal...



Photo courtesy Lamb Rubber Co.

... and in Hycar alone, this combination of characteristics

"Black Magic" is an oil-base drilling mud, used to counteract earth pressures and to lubricate in oil well drill miles underground. Hycar is a chemically designed rubber made to resist oil.

The man in the picture is showing you a pipe protector made by the Lamb Rubber Company for this operation. It is made of Hycar American Rubber and for very certain reasons. First, the protector has to be stretchable—for a 4-inch protector must pull over a 7-inch joint. But it must be resilient, too, so it hugs the pipe by its own natural strength. But that's not enough! Deep drilling means temperatures of 285 degrees F. and better—so the pipe protector must be resistant to heat. Most important of all, however, is the fact

that it must protect metal from abrasion and therefore be many times more abrasion-resistant than metal itself. Lamb tried many materials—settled on Hycar.

So count them: parts made of Hycar are oil-resistant, heat-resistant, abrasion-resistant—resilient, strong and able to stand up under wear. How many materials do you know that combine so many characteristics—and we haven't said yet how Hycar

can be compounded so as to be non-staining, easy-processing and take any color of the rainbow you want to give it! We've told you about its use in oil wells only because you, yourself, might get some ideas about parts or products where Hycar American Rubber will do it better. It's used as an adhesive in many fields, as an impregnant for paper and cloth—and for a list of useful items as long as your arm.

We make no finished products from HYCAR—or from any other B. F. Goodrich Chemical Company raw materials. However, we'll be glad to work with you on any special problems or applications. For more information, write B. F. Goodrich Chemical Company, Dept. O-8, Rose Building, Cleveland 15, Ohio. In Canada: Kitchener, Ontario.

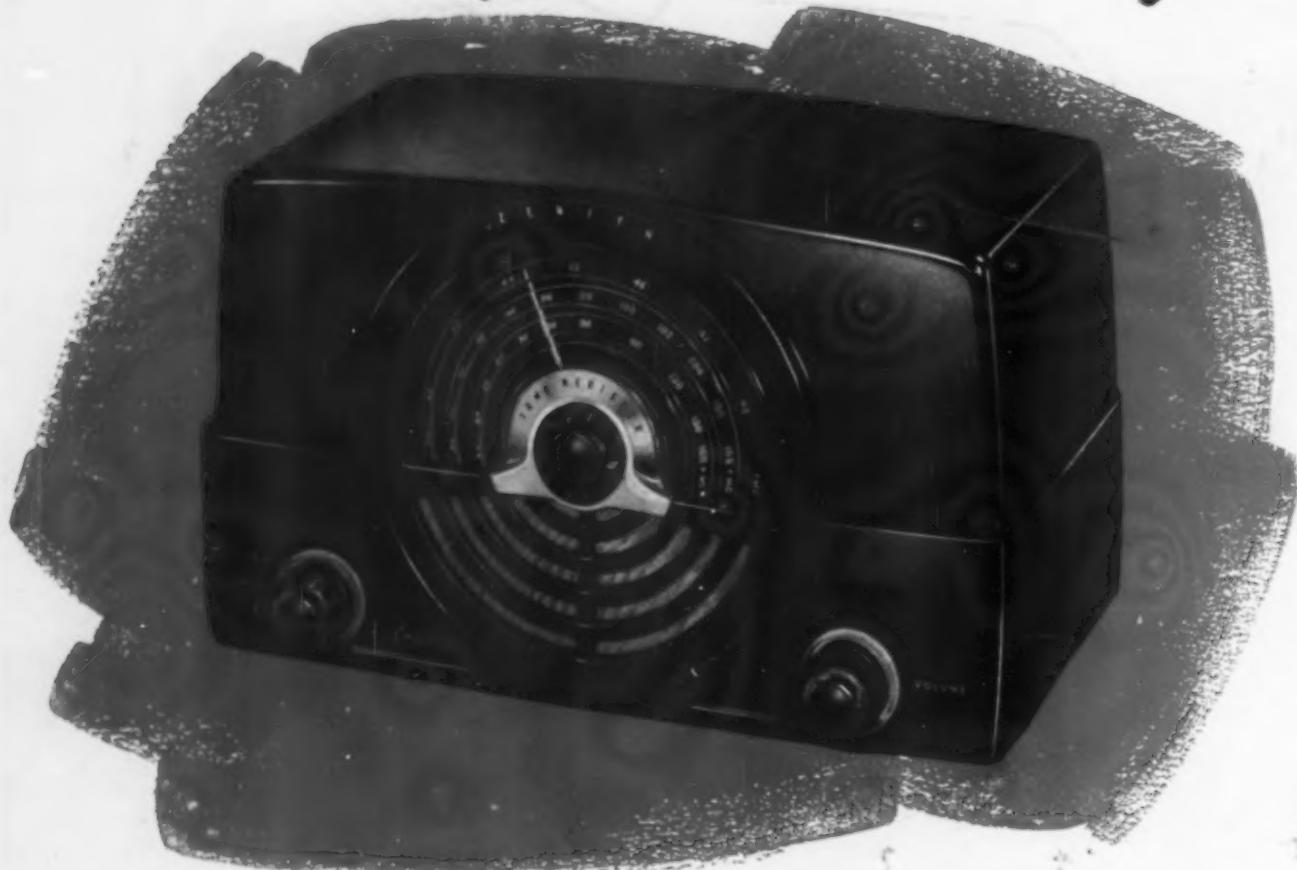
**Hycar**  
Reg. U. S. Pat. Off.  
*American Rubber*

## B. F. Goodrich Chemical Company

A DIVISION OF  
THE B. F. GOODRICH COMPANY

GEON polyvinyl materials • HYCAR American rubber • KRISTON thermosetting resins • GOOD-RITE chemicals

# The Housing Situation - is Good



That's what Zenith says . . . and what you'll say when you see the new Zenith "Symphony" FM-AM radio housed in its handsome plastics cabinet produced by Chicago Molded.

Zenith has set a new standard of fidelity in small receivers with this new model. And, as usual, they came to Chicago Molded for a molded plastics cabinet to match. In design it's unusual since it permits the use of a full-toned 7½" speaker though the cabinet is only 8¾" high. Studs and inserts are molded in, of course, for quick, easy assembly. And only with molded plastics could such a cabinet be economically produced.

We've designed and molded housings of all types during the past twenty-five years . . . housings for

clocks, cameras, electric razors, medical and scientific instruments, flashlights, power tools, to name but a few. We have the facilities . . . every needed size and type of equipment . . . to produce any job most efficiently and economically. We make our own molds in a department that's the envy of the industry. And we back it all with more than a quarter century of experience in plastics.

Like Zenith, our customers usually come back again and again. It seems that Chicago Molded service and quality are hard to duplicate anywhere else.

If you have a housing problem or any other problem that might be solved by the use of molded plastics, we'd like to discuss it with you. No obligation. Just phone or write.

**CHICAGO  
MOLDED  
PLASTICS**

**CHICAGO MOLDED PRODUCTS CORPORATION**

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Representatives in principal industrial centers

**COMPRESSION and INJECTION molding of all plastic materials**

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## Plastics' role in defense

For the second time since Munich, the United States of America is marshalling its resources to prepare the nation for any attack that may be made upon its Government or upon its citizens' way of life.

The budget to meet this contingency will be about \$14,000,000,000 for the fiscal year ending June 1949; experts in military affairs say it will require over \$20,000,000,000 to carry the program through its second year.

The direct effect of this spending upon business will probably not be felt until mid-1949. Of the total \$34,000,000,000, plastics will probably receive only a minute portion in actual dollars. Most contracts for plastics products will be on a developmental rather than a large-scale basis. For example, in the aircraft field the total number of planes to be built will be only 8000, or about the same number produced in one month during World War II. It is therefore probable that the greatest financial benefit ensuing to the plastics industry from the military program, as well as from the corollary European Relief Program, will be from the impetus which it will give to all industry. Furthermore, competent authorities insist that the defense and stockpiling programs will intensify the shortage of metals and other materials so that the door will be ajar for the entrance of more plastics products into new fields.

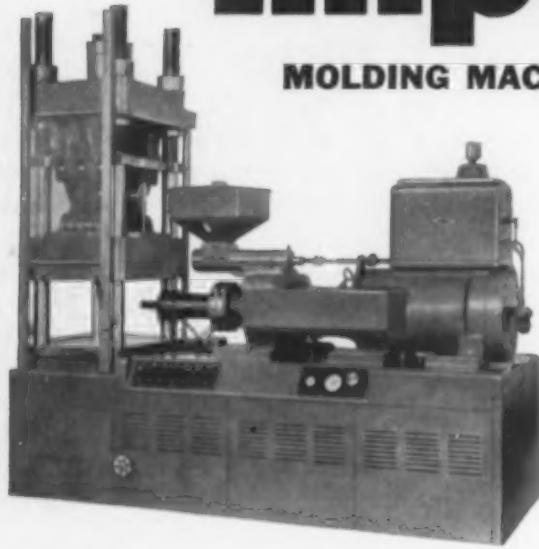
Two other highly interesting angles of the Defense Program are of great concern to the plastics industry. First, military authorities have discovered that several types of plastics are essential in the development of new weapons. New type planes and flying missiles, as well as complex electronic equipment, would seem to be impossible without plastics; fortunately, our plastics technology is thought to be far ahead of that in any other country. Such superiority should be of marked advantage to our Armed Forces, which according to Maj. Gen. A. C. McAuliffe in a recent talk before the PMMA, must create weapons and equipment ahead of our competitors in both time and quality.

Secondly, it is our opinion that the greatest over-all benefit of the Defense Program to plastics will be the resulting stimulus to research and technical development. As in World War II, the current quest by the Services for new and better materials will speed up all progress. Present emphasis is on finished products that will perform in a fashion superior to anything ever known before. The plastics industry has accepted the challenge; everyone from the lowest processor to the most prolific producer of raw materials will benefit from the knowledge that will be gained.

**Mold it faster, better,  
more economically on**

# Impco

MOLDING MACHINES



## Type VF Injection-Compression Machine

The Impco Type VF may be used for:

- (1) Straight injection molding of thermoplastic materials
- (2) Injection-compression molding of thermoplastic materials
- (3) Compression molding of thermosetting materials
- (4) Plunger or transfer molding of thermosetting materials

Unusual results are obtained by combining a vertical clamping unit with a horizontal injection unit. In the vertical unit is a compression ram which operates up through, but independently of, the stationary die platen.

Capacities: 1½, 2, 8, 12, 16, and 22 ounces.

## Units for Controlling Mold Temperatures

By maintaining the proper mold temperature this unit offers many advantages in both injection and injection-compression molding.

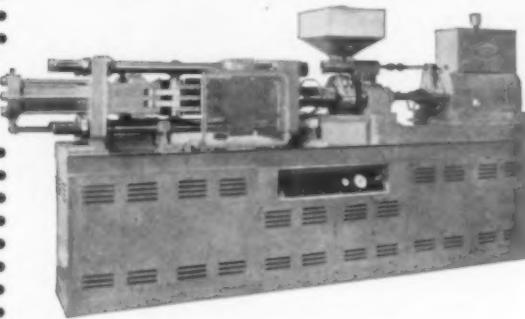


Plunger or  
Transfer  
Machine

This 350-ton machine is the fastest press of its type. Faster loading of pre-forms, faster cull removal and shorter plunger travel are made possible because the high speed transfer cylinder is located *beneath* the stationary platen.

Another unique feature is the 7 to 1 ratio between the clamping mechanism and transfer cylinder. Pressure on either can be adjusted as desired as they are powered by separate pumps.

Available also in 50-ton capacity.



## Injection Machine

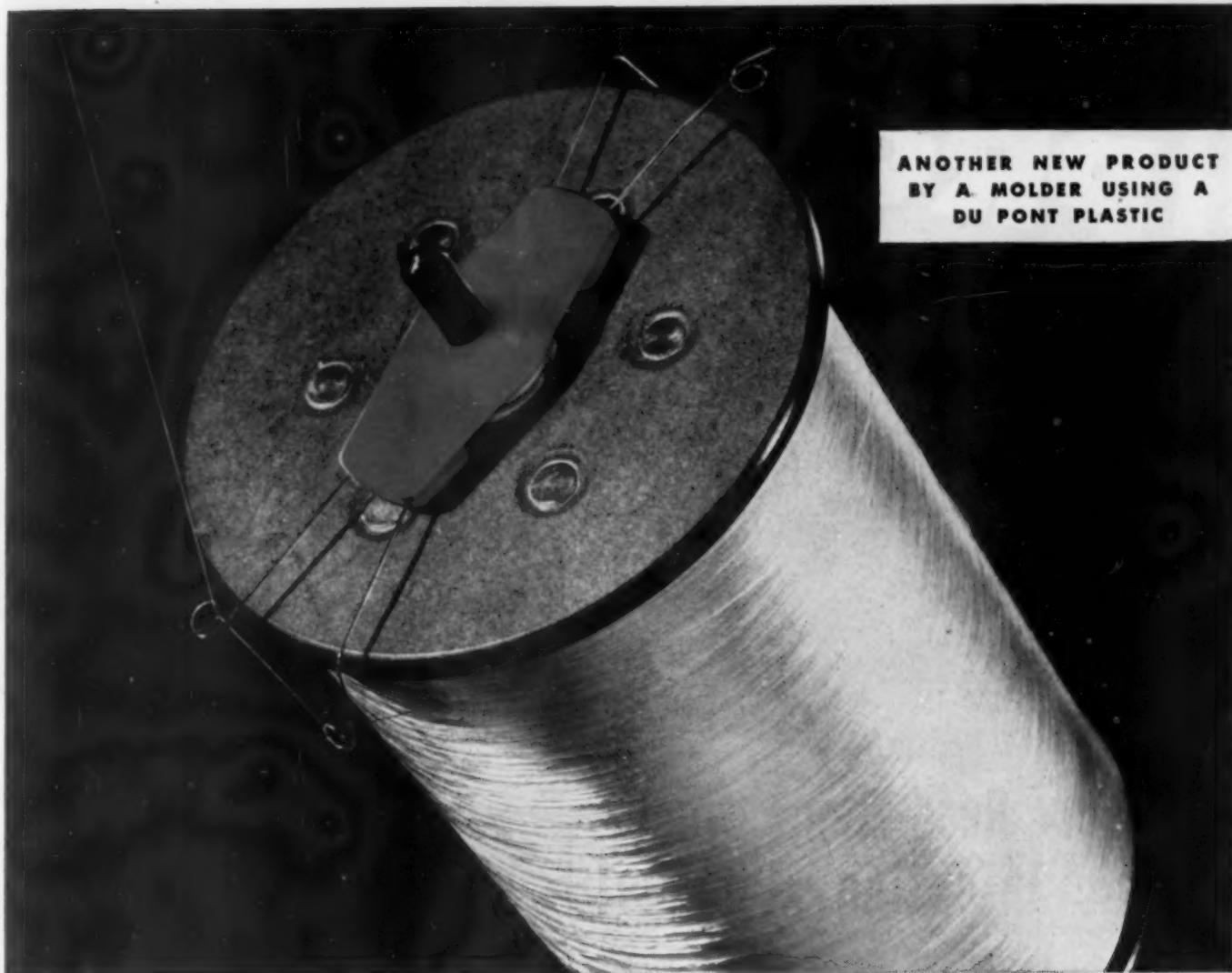
The Impco HF is an efficient high speed machine for straight injection molding. Mechanical features include an improved hydraulic system and heating cylinder. All parts are accessible for easy adjustment. Capacity: 4 ounces.

## Other Impco Machines

- Laboratory Presses, from 10 to 25 tons
- Compression Molding Presses, from 25 to 1000 tons
- Polishing and Laminating Presses, fully hydraulic, from 50 to 1000 tons
- Injection Units, 3 and 5 lb., may be attached to your present compression presses. These operate from a central station hydraulic system

Write for further information or ask for a representative to call

**Improved PAPER MACHINERY CORPORATION**  
PLASTIC MOLDING MACHINERY DIVISION  
NASHUA · NEW HAMPSHIRE



ANOTHER NEW PRODUCT  
BY A MOLDER USING A  
DU PONT PLASTIC

## MR. McHALE TAKES A FLYER

*Molded of Du Pont nylon, his new flyer block pays off in sales*

Mr. McHale makes flyer blocks . . . textile spinning-machine parts that keep yarn under control during twisting. But he became dissatisfied with the types in use. They required lubrication, which splattered on the yarn when the blocks whirled at speeds up to 15,000 rpm. They were complex in construction and easily broken, and they jammed when swollen by absorbed moisture.

So Mr. McHale set out to make a better flyer block. He tested many materials—metals, wood, fibre and plastics. Then he tried nylon plastic . . . and found that no other material combined so many desired properties. In fact, nylon permitted a completely new flyer block design—a compact, one-piece molded unit

with a list of advantages that were bound to build sales.

The nylon blocks are light and strong . . . easily cleaned with soap and water or gasoline. What's more—because of the bearing properties of nylon, they need *no lubrication*. And nylon brought new efficiency to Mr. McHale's manufacturing plant. Each unit is removed from the injection-molding shot as a highly polished, perfectly balanced block. It doesn't need fitting, drilling, reaming or smoothing.

Perhaps you, like Mr. McHale, may find a new path to profits with nylon or another Du Pont plastic—by improving an old product or developing a new one. Write

now for literature. E. I. du Pont de Nemours & Co. (Inc.), Plastics Dept., Room 368, Arlington, N. J.

*Nylon flyer block, injection-molded by M. J. McHale Company, Scranton, Pennsylvania.*

*Du Pont "CAVALCADE OF AMERICA" returns to the air Monday, September 13—NBC network.*





## New Reed-Prentice 4 oz. Plastic Injection Machine!

This shot of toy skis, molded by Rosbro Plastics Corporation of Providence, R. I., illustrates the ability of the new 5A-4 Oz. injection machine to accurately mold in excess of its rated capacity. The shot, weighing 4 ounces of polystyrene, is absolutely without blemishes. Overall measurement is 11 $\frac{1}{4}$ " x 8" and the cavity area is 55 square inches.

This extra capacity machine, at exceptionally low cost, is the answer for molders requiring additional production facilities or for manufacturers with products within the capacity of this model.

For delivery information and literature descriptive of the entire Reed-Prentice Plastic Injec-

tion Molding Machine line (4, 8, 10, 12, 16 and 24 Oz. models) — write Dept. D.

### • SPECIFICATIONS •

Cubic inches molded per shot	5.3
Ounces molded per shot	4
*Plasticizing capacity per hour	30 lbs.
Maximum pressure on material	16,000 P.S.I.
Rate of injection, cubic inches per second	7
Diameter of tie bars	3"
Die opens (stroke)	8"
Maximum die space	12"
Maximum shots per hour	350
Die locking pressure	100 tons
Floor space: length, width, height	148" x 50" x 75"

\*Dependent on product and mold construction

THE WORLD'S LARGEST MANUFACTURERS OF INJECTION MOLDING MACHINES



NEW YORK  
75 West Street

CLEVELAND  
1213 West 3rd Street

LOS ANGELES  
2314 Santa Fe Ave.

**bulky, fibrous materials**

**molded articles**

**versatile....**

# **SANTICIZER 9**

You should investigate the versatile applications of Santicizer 9. It can be used to advantage both in straight molding operations and as a plasticizer wherever thermosetting resins and bulky, fibrous fillers are to be combined.

As a plasticizer for phenolic and urea resins, Santicizer 9 lowers the viscosity at molding temperatures — without materially affecting the speed of cure — thus permitting better flow and more uniform molded articles.

This improved flow is especially valuable where a low concentration of resin is to be incorporated with a bulky filler. For example, brake band manufacturers find that it improves frictional and wearing qualities by uniform distribution of the binder resin in the asbestos fillers of the friction material.

Manufacturers who see possibilities for Santicizer 9 in their operations are invited to write to MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri. For information about the complete family of Santicizers, ask also for a copy of "Monsanto Santicizers ... the quality-building plasticizing agents." Note your request on the coupon if more convenient.

DISTRICT SALES OFFICES: New York, Philadelphia, Chicago, Boston, Detroit, Cleveland, Cincinnati, Charlotte, Birmingham, Houston, Akron, Los Angeles, San Francisco, Seattle, Portland. In Canada: Monsanto (Canada) Limited, Montreal.

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MPO-8

Please send me a copy of the Santicizer booklet.

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Company

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SERVING INDUSTRY... WHICH SERVES MANKIND

# New Sturtevant Dry-Batch Mixers



- ★ Increase Output, Cut Costs
- ★ 4-Way Mixing Action Assures Thorough Blends
- ★ Open-Door Accessibility Permits Fast, Easy Cleaning

The new, improved Sturtevant dry-batch mixers thoroughly and efficiently mix two or more substances into a homogenous and inseparable whole, every part of which has the same analysis. The 4-way mixing action does a more rapid mixing job than other machines. The single receiving and discharging opening permits tight sealing during the mixing process.

Open-door accessibility permits thorough cleaning. The mixer is simple and easy to operate . . . hand lever controls both receiving and discharging. These efficient Sturtevant dry-batch mixers are available in five sizes with mixing capacities from  $7\frac{1}{2}$  tons to 75 tons per hour. Write for bulletin and complete information today.

*Receiving* — The ingredients to be mixed enter the mixing chamber of the drum through a chute. Note scoops which carry up and dump the ingredients as the drum rotates.



*Discharging* — By simply throwing a lever, the inlet is closed and the mixer is in discharging position. The completely mixed materials drop off the lifting scoops and discharge through chute without segregation of ingredients.



## STURTEVANT MILL COMPANY

110 Clayton Street, Boston 22, Mass.

Designers & Manufacturers of

CRUSHERS • GRINDERS • SEPARATORS • CONVEYORS • MECHANICAL DENS and EXCAVATORS • ELEVATORS • MIXERS

The most used car in the showroom is

# Lumarith\*



Lumarith, Hudson Car Model. Injection-molded and assembled by Detroit Macoid, for Toy Founders.

This model of the new Hudson—a 12 inch replica, molded of Lumarith—answers such questions as: why do I step down into the Hudson? . . . how do the fenders get extra collision protection? . . . how is the Hudson engineered structurally to the new look?

Scale models are an inexpensive and effective method of using the technique of visual exposition to merchandise motor cars and other large size products. As in the case of this Hudson model, sections can be molded in transparent Lumarith for clear-through visibility, and inside-spray-painted where required.

Be Sure to Visit  
Celanese Booths 76-77



*A Celanese\* Plastic*

\*Reg. U. S. Pat. Off.

## LUMARITH . . . FOR MODELS . . . FOR TOYS

Here is a check list of advantages that are yours when you use Lumarith (cellulose acetate) molding material:

- UNMATCHED TOUGHNESS
- HIGH SPEED MOLDABILITY
- MOLDING ACCURACY
- BRILLIANT MOLDED SURFACES
- MACHINABILITY WITHOUT ANNEALING
- CEMENTS RAPIDLY AND PERMANENTLY
- NO FINISHING
- TRANSPARENCY OR FULL COLOR RANGE

Get together with your Celanese representative for expert technical and practical advice.

CELANESE CORPORATION OF AMERICA

Plastics Division, Dept. D-1  
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# DURITE



- FAST FREE CUTTING ACTION
- LONG WHEEL LIFE
- HIGH SPEED OPERATION
- MINIMUM THICKNESS ONLY 0.014"
- SUPERIOR PERFORMANCE

*A*brasive wheels, especially designed and embodying these properties, are fast replacing metal saws for slotting hard rubber combs. Their production is made possible by the inherent toughness, heat resistance, and bonding strength of DURITE Phenolic Resins.

THE BORDEN COMPANY  
Chemical Division

5000 SUMMERDALE AVE., PHILA. 24, PA.

# For those BIG JOBS!



## H-P-M'S 6 STAR EXTRA MONEY SAVING FEATURES

- ★ PROVEN DESIGN: H-P-M machines incorporate design "know how" based upon 71 years' experience!
- ★ FAST MOLD CYCLE: H-P-M Injection machines are the fastest in the industry!
- ★ QUICK MOLD SET-UP: No adjustments are required for molds of different thicknesses!
- ★ VERSATILE APPLICATION: Full hydraulic control makes H-P-Ms adaptable to many sizes and types of molds.
- ★ DEPENDABLE SERVICE: A rugged design powered by H-P-M heavy duty radial pumps, valves and controls.
- ★ COMPLETE RANGE OF SIZES: There's an H-P-M for every molding need — 4, 9, 16 and 40 ounces per cycle.

VISIT OUR EXHIBIT AT THE  
S.P.I. PLASTICS SHOW  
BOOTHS 48 and 49



## THE NEW H-P-M "40 oz."

This giant H-P-M "all-hydraulic" injection molding machine opens up an untouched market for the plastics molder. Size and weight are no longer limiting factors. Refrigerator parts, radio cabinets, toilet seats, large instrument housings are typical examples which can now be molded on a production basis with this new H-P-M. There is a demand for big plastic parts. Are you prepared to make them?

There's plenty of die mounting space, daylight and stroke. There's ample plasticizing capacity for the fastest possible cycle. This new H-P-M 40 ounce will put your plastics department in a position to handle those big jobs on a profitable basis. Check the money saving H-P-M features. Write today for complete specifications.

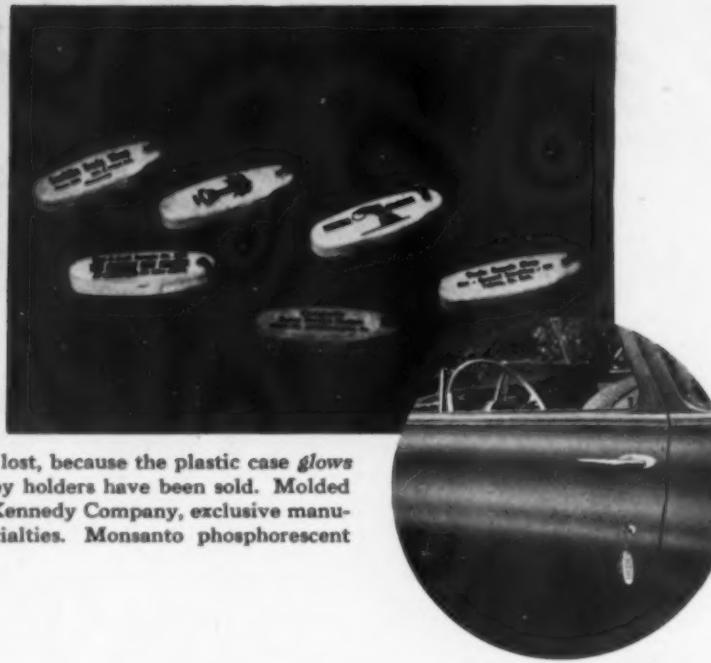
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All-Hydraulic  
Self-Contained

Injection Machines  
FOR MOLDING THERMO PLASTICS

REVOLUTIONIZING PRODUCTION WITH HYDRAULICS SINCE 1877

# ONE MILLION *Plus* SOLD!



"FIREFLY" Key Holders are easy to find in the dark, if lost, because the plastic case *glows* in the dark. That is why more than a million of these key holders have been sold. Molded by Koller-Craft Plastic Molding Company for Skinner & Kennedy Company, exclusive manufacturers of the Exel-O-Craft line of Advertising Specialties. Monsanto phosphorescent Lustron is the plastic used.

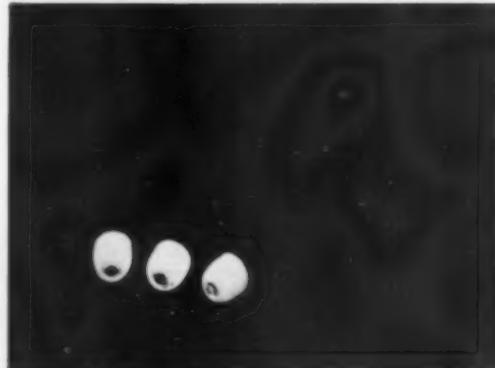
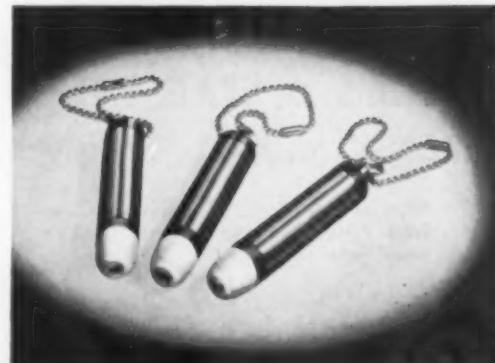
## "Luminous" GOODWILL Builders Make SALES *Glow*

PREMIUMS, advertising specialties and other goodwill builders do a *double* job when they have "luminous" properties. The afterglow that shines in the dark leaves a more lasting impression of the sales message on the viewers' minds. These are but one phase of practical applications for "luminous" plastics. Others include safety signs and markers (for exits, fire escapes, fire stations, and control stations), switchplates, clock cases and dials, table tops, electric push buttons, lamps and lampshades.

Perhaps you, too, have a product that can be made easier-to-sell, or that will help make other manufacturers' products more saleable, by giving it "glowing in the dark" properties. Why not discuss it with our technical staff.

©Reg. U. S. Pat. Off.  
"Luminous" plastics available as molding granules or powders, sheets, films and coatings. Names of suppliers on request.

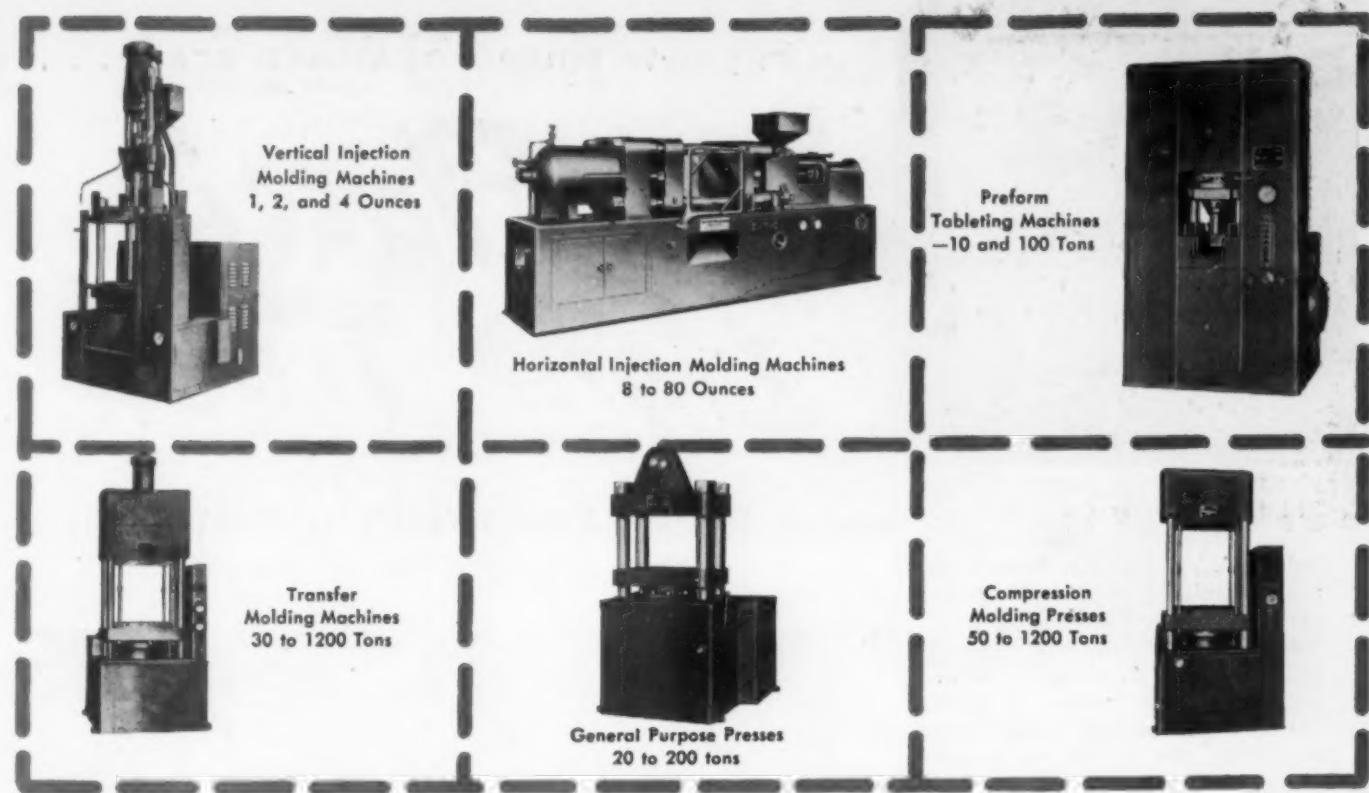
Send for a copy of our booklet "101 Useful Luminous Applications."



MICRO-LITE new "Glow-Tip" miniature flashlights are a glowing example of the premium that really does a job. Molded of Lustron (Monsanto) by Peerless Molded Plastics, Inc., for MICRO-LITE Co., Inc.

THE NEW JERSEY ZINC CO. • 160 Front Street,  
New York 7, N.Y.

*It's Horse Head* Luminescent Pigments that *MAKE* these Plastics "Glow"



*Only*

## WATSON-STILLMAN OFFERS THESE SOLUTIONS TO YOUR MOLDING PROBLEMS:

① The world's most complete, standard line of hydraulic plastics molding equipment.

② 100 years of experience in building hydraulic machinery.

Only Watson-Stillman can offer you a complete, standard line of equipment that can meet almost every molding need — no matter what method, no matter what plastic material you want to use. And, in addition, Watson-Stillman gives you the benefit of their experience gained through 100 years in building hydraulic machinery. So to get modern production speed and efficiency, ease of operation and maintenance plus the cost advantages

of standard design, specify W-S equipment.

The W-S line includes horizontal and vertical injection machines, transfer machines, compression presses, laboratory presses, automatic tableting machines, hobbing presses, record presses and general purpose presses.

Ask W-S for scientific advice in solving your molding problems, without obligation. Detailed information on all machines sent on request.

### WATSON-STILLMAN

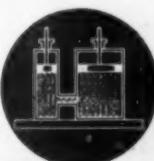
FACTORY AND MAIN OFFICE: ROSELLE, NEW JERSEY  
BRANCH OFFICES: PHILADELPHIA, PA. • CHICAGO, ILL.

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Foreign Sales Representatives: OMNI PRODUCTS CORP., 460 Fourth Ave., N.Y. 16, N.Y.  
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MANUFACTURERS OF THE MOST COMPLETE LINE OF HYDRAULIC MACHINERY



#### W-S "COMPLETeline"

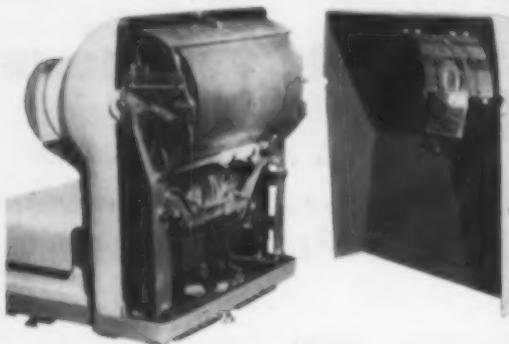
Vertical Injection Machines.....	1, 2 & 4 oz.
Horizontal Injection Machines.....	8 to 80 oz.
Compression Molding Machines.....	50 to 1200 ton
Transfer Molding Machines.....	30 to 1200 ton
Tableting Machines.....	10 and 100 ton
Laboratory Presses.....	10 to 200 ton
Hobbing & Die Sinking Presses.....	200 to 3000 ton
Preformers • Plasticizers • Laminating and Polishing Presses • Record Presses	



IN THE NEW TOLEDO GUARDIAN SCALE . . .

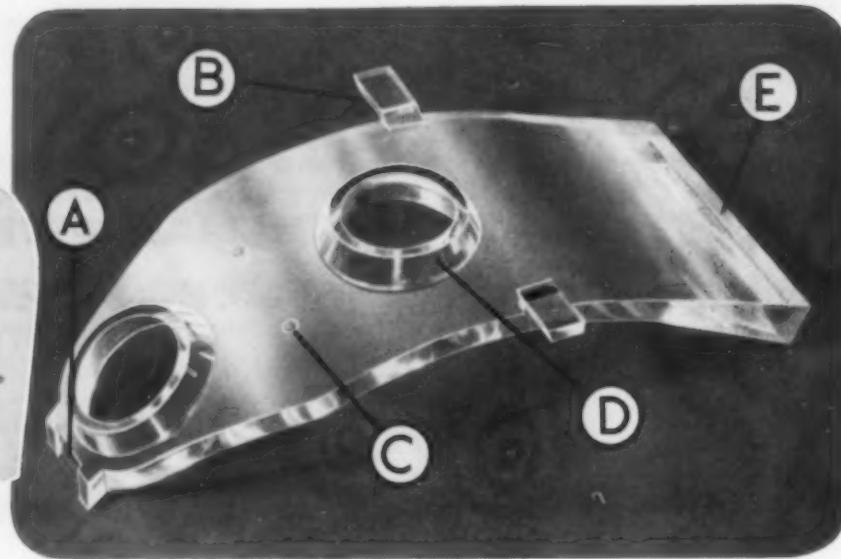
# a Plastic Light Track

ILLUMINATES WEIGHT INDICATOR  
AND TOLEDO TRADE MARK



and skillfully molded . . . transmits the light from this concealed source up to where it's used. The result is a more compact design than could be achieved with conventional lighting.

The myriad properties of the scores of available plastics are known to the plastics expert. It is advisable to submit your product or plans to him for refinement. Here at Aico our 32 years of experience . . . molding all plastics by all methods . . . enables us to offer unbiased recommendations for improving your product by the use of plastics properly applied.



An acrylic resin was selected for this light track because of its ability to "pipe" light by a high degree of internal reflection. A mirror-finished mold in an injection press rapidly produces the tracks, ready for installation after removal of flash. Assembly in the scale is facilitated by the accurately bevelled seat (A) and studs (B). Mounting screws are positioned by holes (C) which are molded in. The sides of the wells (D) surrounding the areas to be lighted are molded at the exact angles best for this purpose. Light is applied at the end (E) which is of greater thickness for better light pick-up and distribution.

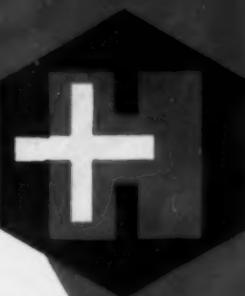
Write today for the Aico Portfolio of plastics applications. It contains 28 actual instances of products made better with Aico molded plastics.



AMERICAN INSULATOR CORPORATION  
New Freedom, Pennsylvania

MANY THINGS ARE BETTER BECAUSE OF PLASTICS

# PUT THE PLUS IN YOUR PROCESS!



## HEYDEN CHEMICALS

### For Assurance of Results . . .

If it's a question of selecting the right chemical . . . of streamlining your production through improved reaction stages . . . of stepping up quality and sales appeal . . . there's probably a Heyden industrial chemical to fit your exact requirement.

When you standardize on Heyden, four major advantages are assured:



Constant source of supply. • Production control through uniformity.  
Exacting specifications . . . assured quality. • Extensive facilities of 5 modern plants.

Heyden's ceaseless research and far-reaching technical know-how are always at your command . . . to help put that PLUS in your process or product.

#### Of Importance to Manufacturers of Plastics and Resins

*Heyden*

- FORMALDEHYDE
- PARAFORMALDEHYDE
- HEXAMETHYLENETETRAMINE
- PENTEK® (For mar-resistant coatings)
- LIGNOCOL® (Anti-skinning agent)

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*Serving Industry Through Finer Chemicals*

## HEYDEN CHEMICAL CORPORATION

393 SEVENTH AVENUE, NEW YORK 1, N. Y.

CHICAGO OFFICE, 20 North Wacker Drive

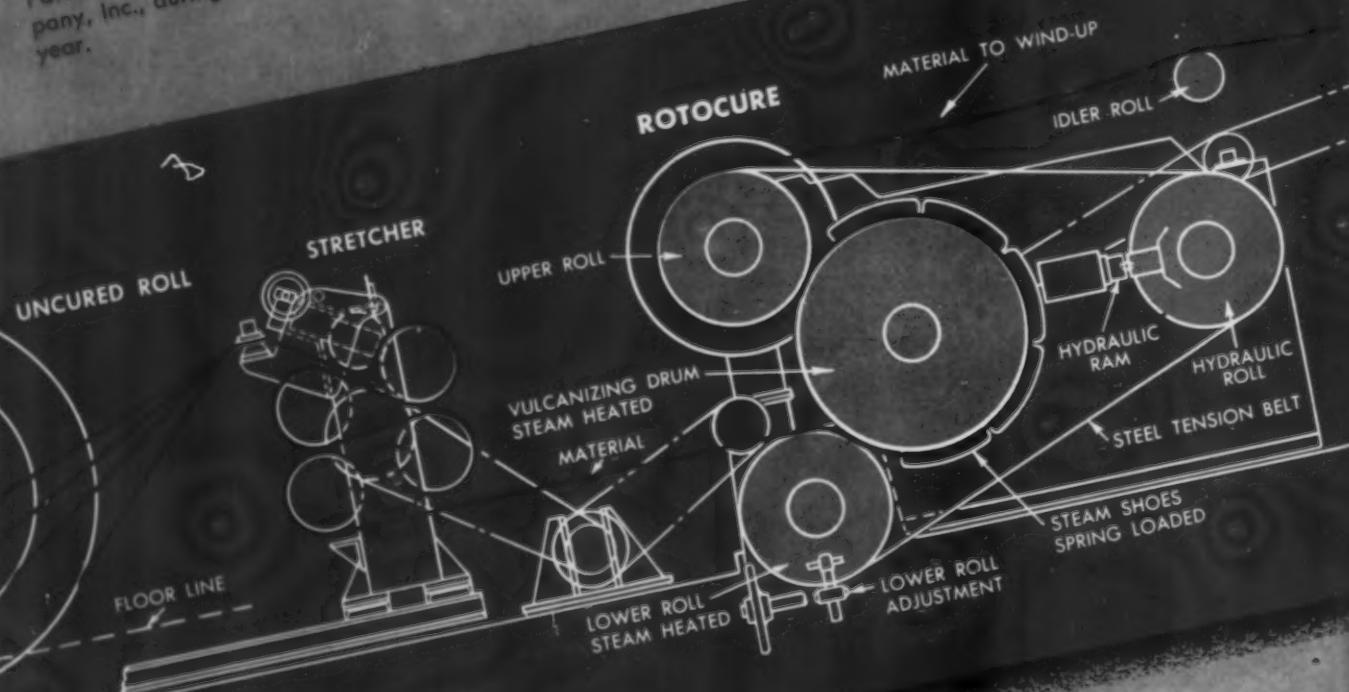
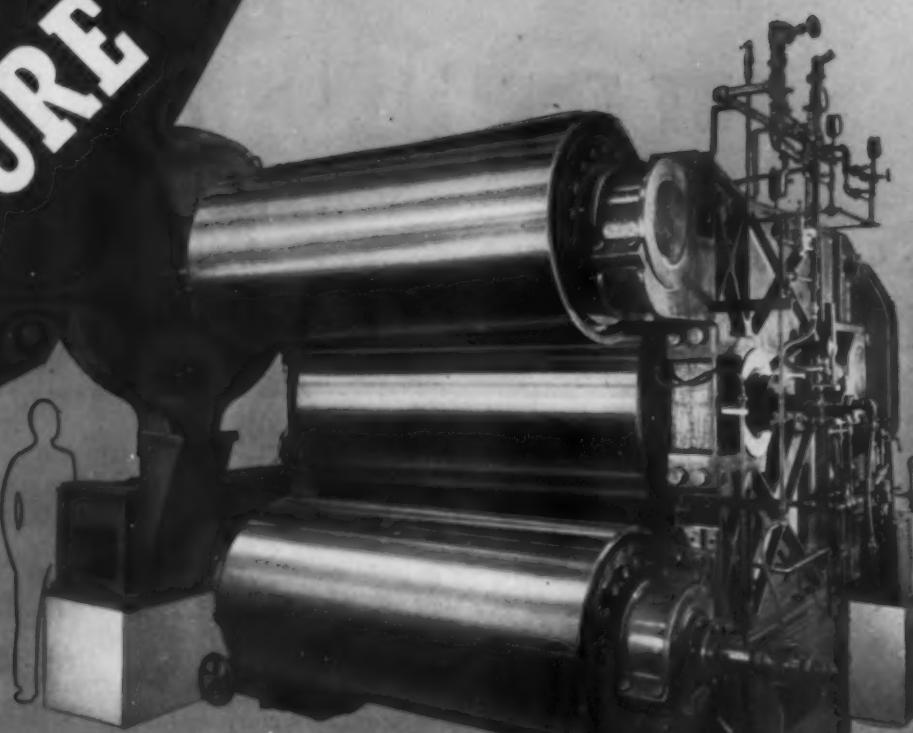
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Benzaldehyde • Benzoates • Benzoic Acid • Benzyl Chloride • Bromides • Chlorinated Aromatics • Medicinal Creosotes • Formates  
Formaldehyde • Formic Acid • Glycerophosphates • Medicinal Guaiacols • Hexamethylenetetramine • M.D.A. • Paraformaldehyde  
Parahydroxybenzoates • Penicillin • Pentaerythritols • Salicylates

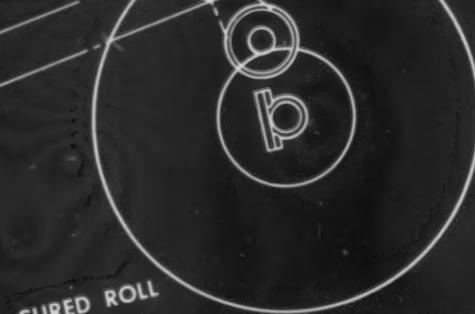
# THIS IS THE ROTOCURE®

The Rotocure is a patented machine built under license from Boston Woven Hose & Rubber Co. The machine illustrated is 80' face width, and is one of seven built by Farrel-Birmingham Company, Inc., during the past year.



**Farrel-**

# FOR CONTINUOUSLY VULCANIZING RUBBER AND PROCESSING PLASTICS



**FARREL-BIRMINGHAM COMPANY, INC., ANSONIA, CONN.**  
Plants: Ansonia and Derby, Conn., Buffalo, N.Y.  
Sales Offices: Ansonia, Buffalo, New York, Boston, Pittsburgh,  
Akron, Chicago, Los Angeles, Tulsa, Houston.

**Birmingham** <sup>®</sup>

## HOW THE ROTOCURE WORKS

In operation, the rubber or plastic material is carried around an arc of the heated steel drum by a wide, high tensile, steel belt (see diagram). The belt, which is tensioned by a back roll actuated by hydraulic cylinders, maintains a pressure on the material of approximately 60 to 65 P.S.I. Located around the circumference of the drum, and bearing against the back of the steel belt, are five heating shoes.

The drum and shoes are heated internally by steam to give a material temperature of approximately 280° to 300° F for rubber and 300° to 340° F for plastics. For gauge control, the material is fed to the drum over the lower pressure roll which can exert pressure up to approximately 1000 pounds per linear inch.

The lower pressure roll is internally heated by steam to preheat the material and thus reduce the time of passage around the main drum. Where required for postheating, the top roll can also be steam-heated.

## PRODUCTS THE ROTOCURE CAN PRODUCE

Where the run of any one size or type of materials is great enough, the *Rotocure* has a number of advantages over vulcanizing presses for producing: Conveyor belting, transmission belting, floor matting (supported and unsupported), rubber flooring (sheet and tile), plastic flooring (sheet and tile) and plastic laminations. In addition, the machine has great possibilities for the production of many other rubber and plastic products.

## ADVANTAGES

The advantages of this machine over vulcanizing presses are: (1) Continuous operation increases production by eliminating interruptions for opening, unloading, loading and closing; (2) where material is cured in long lengths, double-cure stretch are avoided; (3) less floor space is required, and (4) the work area can be kept cleaner and free from water which is common in belt press pits.

Comparison of production costs indicates that where manufacturing conditions favor the use of the *Rotocure*, this machine, on some products, can save up to nearly 50 per cent of the cost of producing an equivalent volume with a vulcanizing press.

## HOW YOU CAN LEARN MORE ABOUT THE ROTOCURE

We shall be glad to have a Farrel-Birmingham engineer discuss with you the possibilities of the machine for your particular conditions. The experience gained in building seven of these machines for different applications will be of value in determining what the machine can be expected to do for you. A request for an appointment (or for further details by mail) involves no obligation.

# CUT 1000 POUNDS

of plastic "diamonds"

# PER HOUR...



Compactly designed and completely enclosed, the new NRM Heavy Duty Rotary Chopper provides for maximum production and safe, semi-automatic operation.

## with this NEW NRM HEAVY DUTY CHOPPER

THIS is the new NRM Heavy Duty Rotary Chopper—a complete, self-contained unit for cutting pre-formed thermoplastic strips and multiple strands into tiny pieces of pre-determined size and shape. Consider the savings in production time. With a nominal capacity of 1000 pounds per hour, the NRM Heavy Duty Rotary Chopper will cut all types of milled or extruded plastic materials into oval, cube or diamond shaped pellets, particularly adaptable for molding or extrusion compounds. Unlike ordinary choppers, (which must be hand fed) two sets of driven rolls synchronized with rotor, insure positive feed into the cutter and uniform size of pellets.

Attractively designed, compactly built, this sturdily constructed chopper may be installed in a space only 6' x 6' 6". The entire unit is mounted on a heavy gage steel base and all component parts may be assembled for right or left hand operation. Steel guards provide complete safety for the operator.



NO OTHER CHOPPER HAS ALL OF THESE FEATURES.

**HOUSING**—Sturdy, welded steel construction. Top half, light in weight, hinged for easy access to Rotor. Safety switch prevents operation when housing is open.

**CHUTE**—Bolted to bottom of lower housing and equipped with electrically vibrated screen for removing "fines". Chute is provided with connection for vacuum exhaust of "fines".

**ROTOR**—Accurately machined and balanced steel forging with 4 "battle axe" steel knives. Knives are adjustable to compensate for regrinding and may be replaced individually.

**FEED ROLLS**—2 sets of driven, guarded rolls insure positive feed into cutter and uniform pellet size.

**DRIVE**—10 HP U.S. Vari-Drive for operation on 220/440 volts, direct coupled to rotor shaft, provides cutter speeds of 225 to 900 RPM maximum, or 900 to 3600 cuts per minute.

**NATIONAL RUBBER MACHINERY CO.**

General Offices: AKRON 8, OHIO

California Representative: Sam Kipp, P. O. Box 441, Pasadena 16, Calif.

**Plastics**  
MACHINERY DIVISION

EXPORT DISTRIBUTORS: OMNI PRODUCTS CORPORATION, 460 FOURTH AVE., NEW YORK 16, N. Y.

A

# Keen Edge

ON SKILLFUL MOLDING



*Penife, molded for Furman, Inc., Chicago*

What is more natural than making a pen knife that looks like a pen? And what is more natural than choosing a molder for the job with heavy experience in molding plastic parts for pens—as well as for knives?

Elmer E. Mills Corporation has an extensive background in the molding of small parts of all types including, of course, pen parts and knife handles. Our job of turning out the plastic parts for this PENIFE was certainly a "natural." The knife sheath called for the smooth, sleek lines of a pen barrel plus the firm grip of a tool. The plastic part which held the blade required precision molding. Like all other Mills molded products, the right material was used in the *correct* molding technique.

Let our molding skill help you give your plastic products a keen edge on sales appeal. Tell us today when our representative may call.



Write on your letterhead for the new *Injection Molded and Extruded Plastics Catalog*. Or, for detailed information about **ELMER PLASTIC**\*, piping, tubing and fittings, write for circulars containing data and illustrations.

\*Trademark Registered

**ELMER E. MILLS CORPORATION**

INJECTION MOLDERS and EXTRUDERS of: Tenite, Lumarith, Fibertex, Lucite, Plexiglas, Nylon, Polystyrene, Styron, Lustron, Loolin, Vinylite, Geon, Plexene, Polyethylene, Lustrax, Forticel, **ELMER PLASTIC**\*, Saran, and other Thermoplastic Materials.

153 WEST HURON STREET • CHICAGO 10, ILLINOIS

RCA VICTOR Portable

*Goes to Town*

dressed up in MPc plastic cabinet

So much value . . . so much style . . . at such a tempting price! No wonder this portable has become a pace setter.

The plastic cabinet, tooled and produced at MPc, contributes to both its high style and its low price. It steps out of the chrome plated molds sleek and lustrous . . . requires no costly finishing. Twenty assembly holes and the recesses for hinges are cored in to save fabricating costs.

Such sales-and-production-wise planning is what you will find at MPc, capably staffed and equipped with the most advanced production facilities. Submit your plastics product or problem to: MOLDED PRODUCTS CORPORATION 4535 W. Harrison St., Chicago 24, Illinois.



PLASTICS DIVISION  
**MOLDED PRODUCTS**  
CORPORATION



COMPRESSION, INJECTION AND TRANSFER MOLDING

*Another tough  
job licked with  
**CO-RO-LITE**  
the rope fibre plastic*

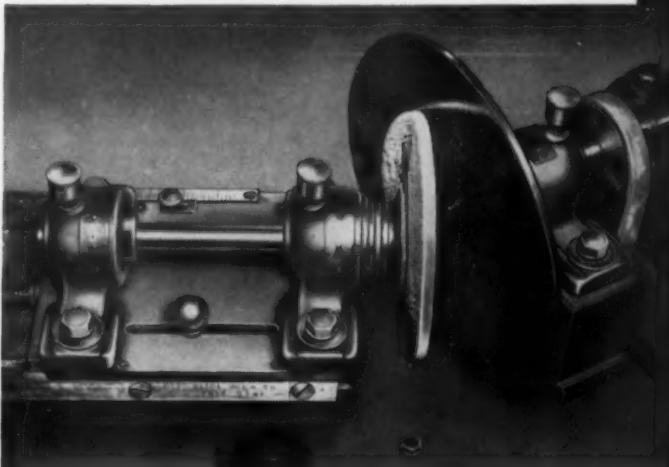


**Readily Pre-formed and Molded  
INTO COMPOUND CURVES  
DEEP DRAWS  
ANGLES  
CHANNELS  
LARGE SHELLS**

● Dense, hard Co-Ro-Lite forms the hub of this sanding pad, while flexible Co-Ro-Lite forms the pad. Typical of the adaptability of this Rope Fibre Plastic to industrial use.



● Cross-sectional view shows the successful joining of two densities of Co-Ro-Lite.



● This Torture-Test proves that Co-Ro-Lite pads will outwear old style sanding pads.

**CO-RO-LITE** is equally effective with fluid pressure or high pressure. Long, tough interlocking rope fibres reinforce all sections of the molded unit, imparting great impact, flexural, compressive, and tensile strength in a range of densities comparable to wood.

CO-RO-LITE: Rope Fibres impregnated with thermo-responsive resin: Product and Process Patented. Patents No. 2,249,888 and No. 2,372,433; other patents pending.



**COLUMBIAN ROPE COMPANY**

460-92 Genesee St., Auburn, "The Cordage City," N. Y.

Canadian Licensee: Canadian Bridge Engineering Co., Ltd.  
Box 157, Walkerville, Ontario, Canada

# INFORMATION YOU WANT TO HAVE ABOUT BARRETT PLASTICIZERS



## SEND FOR YOUR COPY OF RELEASE NO. 48-1

This 20-page technical booklet, complete with charts and tables, describes the performance of Barrett Plasticizers in Vinyl Copolymer Resins. It includes descriptions, properties and processing data for Barrett Plasticizers 50-B, Dicyclohexyl Phthalate and Dibutyl Phthalate, as well as comparative data on Dioctyl Phthalate.

A copy of Barrett Release No. 48-1 will be sent you free on request.

THE BARRETT DIVISION  
ALLIED CHEMICAL & DYE CORPORATION  
40 Rector Street, New York 6, N. Y.



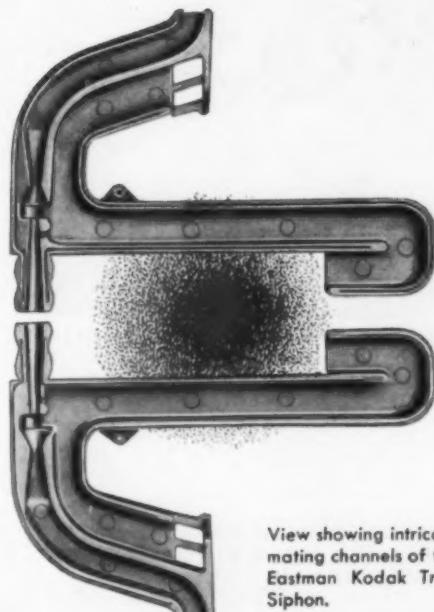


## Quality... FROM DIES TO FINISHED MOLDED PRODUCT

CORRECT and accurate dies are the first essential for quality molded plastics. We design and make dies for Erie Resistor Custom Molded Plastics in our own plant, where expert die makers have the advantage of constant contact with design engineers, chemists, and production chiefs.

If good molded plastics require precision dies, they also demand the best raw materials, chosen with expert knowledge of their fitness to meet the requirements of the finished piece in service. And to shape those materials successfully calls for an intimate knowledge of their behavior in the molding process.

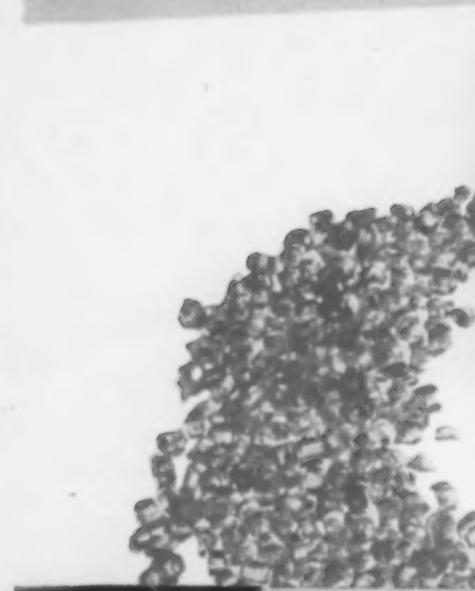
The Kodak® Tray Siphon, shown above, with its intricate convolutions of matching tongue and groove in the two halves, is an excellent illustration of a product requiring a high degree of skill at every step—from dies to finished product.



View showing intricate mating channels of the Eastman Kodak Tray Siphon.

Plastics Division  
**ERIE RESISTOR CORP., ERIE, PA.**  
 LONDON, ENGLAND      TORONTO, CANADA

# What's the big news



**KOPPERS NEW FACILITIES** at Kobuta, Pa. have capacity enough to assure a steady, uniform supply of polystyrene to the largest as well as the smallest molders.



**SCIENTIFIC COLOR MATCHING** at Kobuta is assured by this spectrophotometer which matches color shades within extremely narrow limits.



**REFRIGERATOR BOXES** molded from Koppers Polystyrene PB-3. Lugs on the bottom of one box fit into slots on the top of the other to prevent slipping. Made by F & F Mold and Die Works, Dayton, Ohio.

# in Plastics?

# KOPPERS POLYSTYRENE

Made by a revolutionary new process which assures:

**BETTER MOLDABILITY**

**UNIFORM PHYSICAL PROPERTIES ORDER AFTER ORDER**

**SUPERIOR COLOR MATCHING**

KOPPERS huge new polystyrene plant at Kobuta is rapidly swinging into full production. This is not just another plastics plant but one that makes polystyrene by a distinctly different process commercially pioneered by the Koppers Research Department. The result is a superb polystyrene, noted for its clarity and uniformity.

To the plastics industry, this means better moldability, more perfect parts per pound and lower costs. You are assured of a dependable source of supply capable of handling the largest orders.

Koppers Polystyrene is available at present in two types. PB-3 is for use at ordinary temperatures and has excellent molding properties. PB-7

offers 20 degrees increase in heat resistance and a faster molding cycle at no increase in cost. Both types are made in the popular pellet form . . . crystal clear or in any color of the rainbow.

Colors are accurately matched with a spectrophotometer. Shades can be duplicated within extremely narrow limits.

To assure the best molding results, Koppers maintains a staff of technicians thoroughly experienced with molding problems. These men are ready at a moment's notice to come to your assistance. Their help is a part of Koppers service and costs you nothing.

**KOPPERS COMPANY, INC.**  
Chemical Division, Pittsburgh 19, Pa.

Get the complete story on Koppers Plastics.

Koppers Company, Inc.  
Chemical Division  
Koppers Building, Pittsburgh 19, Pa.

Gentlemen:  
Please send your literature on Koppers Plastics.

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Position.....  
Company.....  
Address.....



## Koppers Plastics

\* POLYSTYRENE

\* CELLULOSE ACETATE

\* ETHYL CELLULOSE



COMMON SENSE  
ASSEMBLY ENGINEERING



# ... Exposes Needless Operations

• WHEN DESIGNING their smartly styled Rediflex Camera, the Ansco Division of General Aniline & Film Corp. made a careful check of all fastening methods in an effort to keep assembly fast and simple without sacrificing strength.

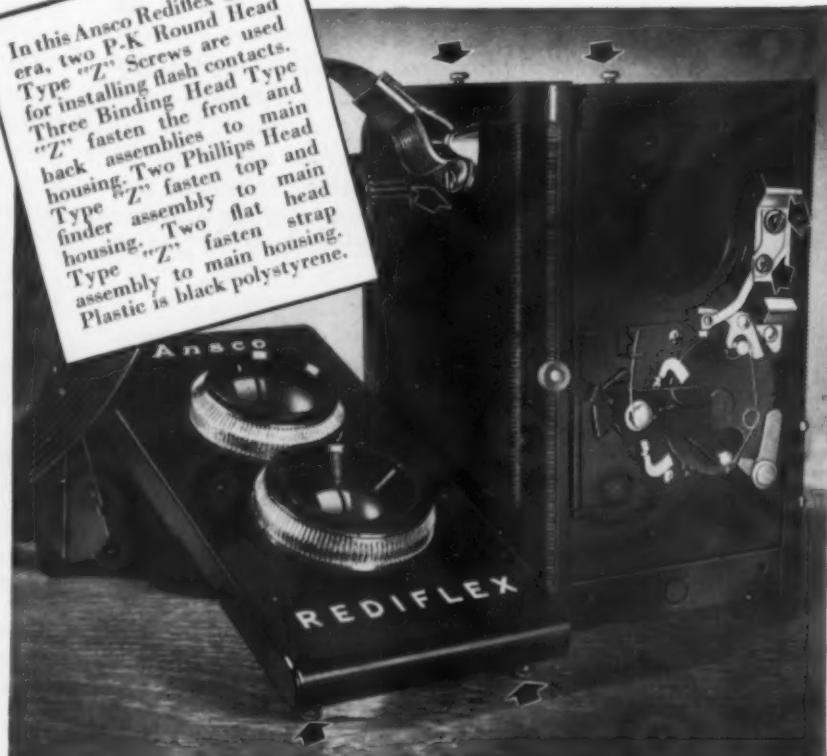
For speed, security, and economy P-K Self-tapping Screws proved to be the obvious choice. What could be simpler than driving screws into plain untapped holes? No need for mold-slaving inserts, troublesome tapping, or other needless operations that would run up assembly costs. And P-K Screws often make possible improvements in product design.

Examine your own fastening methods. You can probably make similar savings in time and money by using P-K Self-tapping Screws. Records prove that in 7 out of 10 jobs, P-K fastenings will save up to 50% in assembly work-hours.

Whether your product is in the planning stage or in production, call in a P-K Assembly Engineer and talk it over. Or, if you prefer, mail assembly details for recommendations. Parker-Kalon Corp., 200 Varick St., New York 14, N. Y.

Sold Only Through Accredited Distributors

In this Ansco Rediflex Camera, two P-K Round Head Type "Z" Screws are used for installing flash contacts. Three Binding Head Type "Z" fasten the front and back assemblies to main housing. Two Phillips Head Type "Z" fasten top and bottom assembly to main housing. Two flat head Type "Z" fasten strap assembly to main housing. Plastic is black polystyrene.



**P-K**  
*The Original*

A TYPE AND SIZE FOR EVERY METAL AND PLASTIC ASSEMBLY



TYPE  
"A"



TYPE  
"Z"



HEX HEAD  
TYPE "Z"



TYPE  
"F"



TYPE  
"U"



TYPE "F-Z"  
PHILLIPS

**PARKER-KALON SELF-TAPPING SCREWS**

OTHER PARKER-KALON PRODUCTS

COLD-FORGED SOCKET SCREWS • HARDENED SCREWNAILS AND MASONRY NAILS • SHUR-GRIP

FILE AND SOLDER IRON HANDLES • METAL PUNCHES • DAMPER REGULATORS AND ACCESSORIES

# PROVED!

**...for fast,  
accurate  
molding!**

- the new DeMATTIA Injection Presses

The reputation DeMATTIA Molding Presses and Molding Equipment are specified year after year, by molders throughout the world, because of their dependability. One sure way to insure plastic production is the specification of DeMATTIA machines and DeMATTIA molds in your plant.



### **Rugged Hydraulic Horizontal Press —**

An efficient DeMATTIA press featuring proper design, finest workmanship and materials and built to function smoothly in heavy, continuous service. Solid base and tension members, open feed for visual inspection and fast, contamination-free color changing are only a few of the many advantages. Available in 6, 12 and 24 ounce capacities.

### **New Vertical Injection Press —**

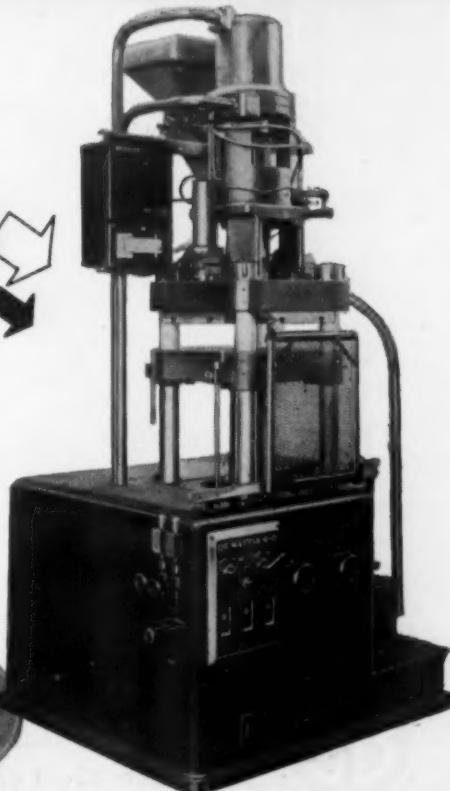
Suitable for general injection molding, the DeMATTIA Vertical Type performs excellently on exacting insert work. Compact design requires a minimum of floor space in the molding plant. Furnished in 4 and 12 ounce capacities. Complete data and specifications sent promptly on request.

### **DeMATTIA Complete Molding Equipment —**

DeMATTIA Machines for the molding industry include injection presses, scrap granulators and cutters for quick handling of even large scrap material. DeMATTIA scrap grinders make it possible for molders to save valuable storage space and eliminate costly processing charges. For the molder requiring assistance on design, DeMATTIA will plan and make molds that will help assure successful molding. **WRITE FOR ILLUSTRATED LITERATURE.**

**DE MATTIA MACHINE  
and TOOL CO., CLIFTON, NEW JERSEY**

New York Sales Office: 50 Church St. • Cable Address: Bromach, N. Y.



# Mr. Manufacturer -

meet your  
severest critic



People who buy products, whether they are radios or circuit-breaker units, judge them by **PERFORMANCE**.

You, Mr. Manufacturer, should rely on the "plastics-wise" molder to help you get the nod of approval from the consumer.

TECH-ART has been in business since 1891 . . . proof of molding performance over the years.

TECH-ART has diversified equipment capable of handling all types of plastic molding materials. Automatic and semi-automatic compression molding machines as well as injection, transfer and high speed plunger equipment are at your service. Just state the quantity you need and when you want it.

TECH-ART will give you a quotation within 24 hours after your drawings or samples are received. Call TECH-ART first for the finest plastic custom molding!

TECH-ART representatives are located in the following cities: Cincinnati • Cleveland • Detroit • Philadelphia • Rochester • Washington, D. C.

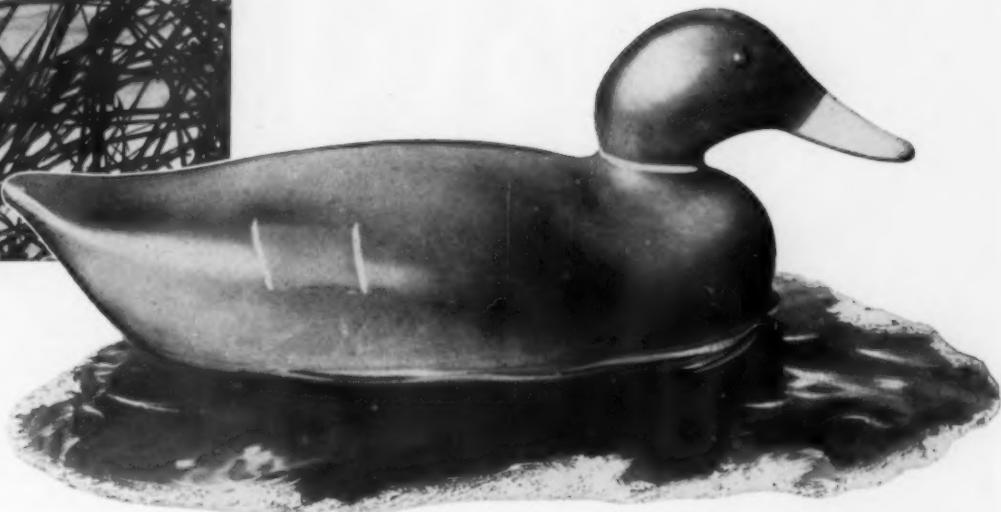


Successors to Boonton Rubber Company  
Factory: 41-01 36th Avenue,  
Long Island City 1, N. Y.  
Sales Office: 35-42 42nd Street,  
Long Island City 1, N. Y.

**TECH-ART**  
PLASTICS COMPANY



Want to  
shoot a duck?



*You'll learn how the American Anode process sets new targets in manufacturing*

**N**O cousin to the clay pigeon or the old wooden duck decoy, these are rubber ducks you can shoot full of holes—but they won't sink. To the duck that flies the skies, a set of two drakes and one hen sitting on the water look very real indeed. And to the man who goes duck hunting, here are duck decoys that fit conveniently a dozen to the shoe box, won't break off like the old wooden kind and make him grateful to the Rubber Products Division of the Electric Eye Equipment Company, Danville, Illinois, who thought them up.

Thus another manufacturer is opening up another new market thanks to things the American Anode process can do that can't be accomplished any other way. The forms for these ducks are intricate—but they come out all-of-a-piece from a single dipping,

ready to be decorated, packaged and sold. Maybe these ducks will give you an idea.

They also demonstrate characteristics you can get with American Anode latices and mixes that stand up under heat and cold . . . resist water, abrasion and strain . . . and that can be sprayed, spread, saturated, dipped or brushed. Call on us for compounded latices of GEON, HYCAR, neoprene, crude rubber and GR-S. For more information about these modern materials and proper methods of using them, please write Department AF-4, American Anode, Inc., 60 Cherry Street, Akron, Ohio.

**AMERICAN ANODE**  
INCORPORATED

CRUDE AND AMERICAN RUBBER LATICES, WATER CEMENTS AND SUSPENSIONS



# MOSINEE

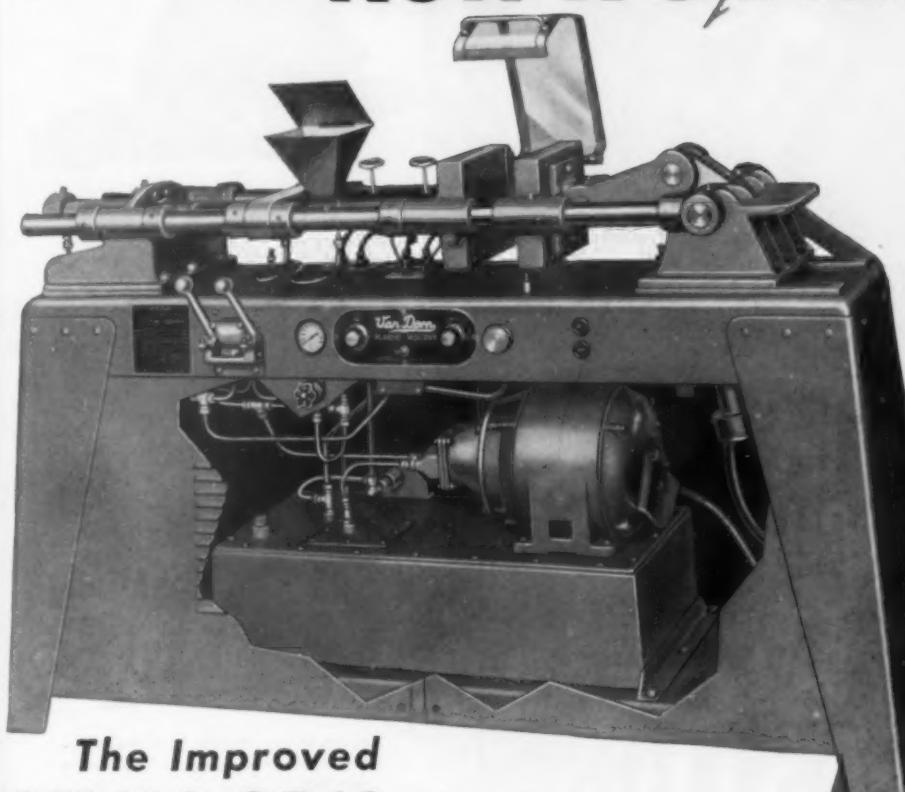
*"More than Paper"*

To the plastics industry, MOSINEE stands for paper-base processing materials with scientifically controlled chemical and physical properties, quality and uniformity . . . high tensile and tear strength with high absorptive capacity.

Other technical characteristics are controlled to meet specific plastics production requirements.

**MOSINEE PAPER MILLS COMPANY • MOSINEE, WIS.**  
*"Essential Paper Manufacturers"*

*Always Outstanding*  
**NOW IT'S EVEN BETTER!**



*The Improved*  
**VAN DORN Plastic Press**

Spreader added to heating cylinder cuts heating cycles up to 50%.

Hard Chrome Plating of interior of cylinder cuts resistance to flow of materials, protects against corrosive compounds.

New Relief Valve—set at 1500 P.S.I. insures maximum clamping pressure always, permits separate adjustment of injection pressure.

New Needle Valve increases gage life, by allowing gage to be shut off except for periodic checks on pressure.

*SAME LOW PRICE!!*

With the addition of these four new features, this Van Dorn Press is unequalled in the 1 oz.-capacity class for molding practically all thermoplastics including nylon. This remarkably economical press—

**Costs under \$2000**

**Operates 8 hours for under a dollar**

**Uses less expensive molds**

**Can be set up by one man in 20 minutes**

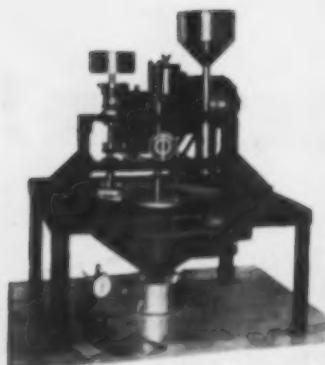
This Van Dorn Injection Press is unexcelled for profitable production of small parts, and "pilot" or experimental runs on bigger jobs.

We make mold bases for Van Dorn Presses.

THE  
**Van Dorn**  
 IRON WORKS CO.  
 2687 EAST 79th STREET • CLEVELAND 4, OHIO

**FREE BULLETIN** tells all the facts.  
 Write for it.

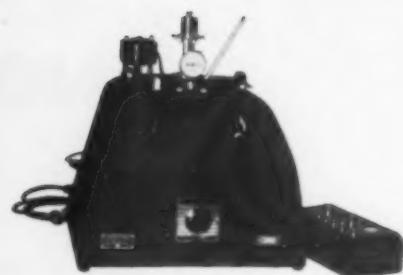




WEAROMETER: Designed to determine wear resistance and/or surface abrasion on many types of materials.



PLASTIVERSAL: For precision tests in tension and flexure, on film, sheet or molded specimens. Thick plates, blocks, etc., tested to heavy loads in flexure or compression. The Universal Testing Machine for Plastics.



DISTORTION TESTER: Widely used by producers of molded plastics and electric insulating materials for indicating heat distortion temperature.



IMPACT TESTER: Patented "Change-O-Matic" head, gives with a single hammer, quick reading Charpy and Izod tests.



STIFFNESS TESTERS: In 1, 6 and 50 inch pound capacities. For testing sample strips or completed products — detects small variations in elasticity, brittleness, toughness and plastics flow.

# OLSEN MACHINES DESIGNED FOR THE TESTING OF PLASTICS

Write for descriptive literature on all these machines designed specifically for the Plastics Industry

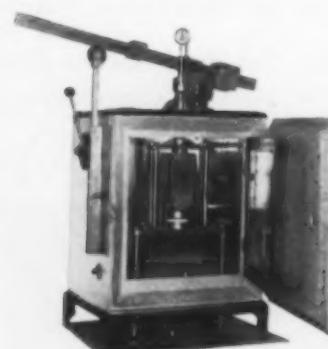
**TINIUS OLSEN**

Testing & Balancing Machines

**TINIUS OLSEN TESTING MACHINE CO.**  
580 North Twelfth Street, Philadelphia 23, Pa.

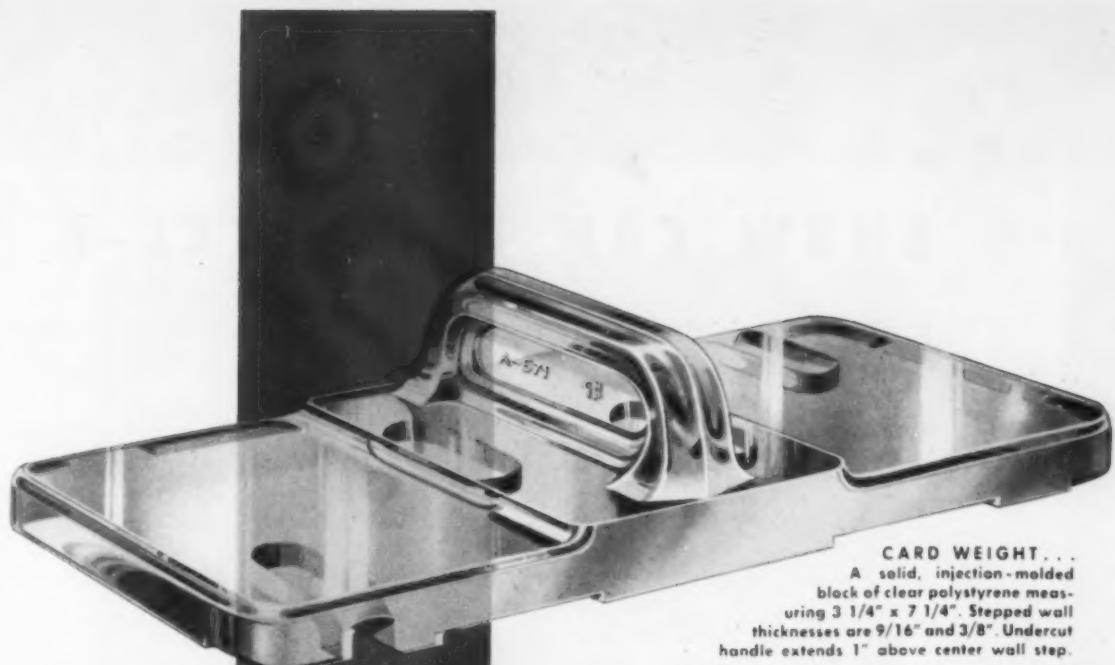
Representatives:

Pacific Scientific Co., Los Angeles, San Francisco, Seattle • Mine Smelter Supply Co., Denver, Colo.

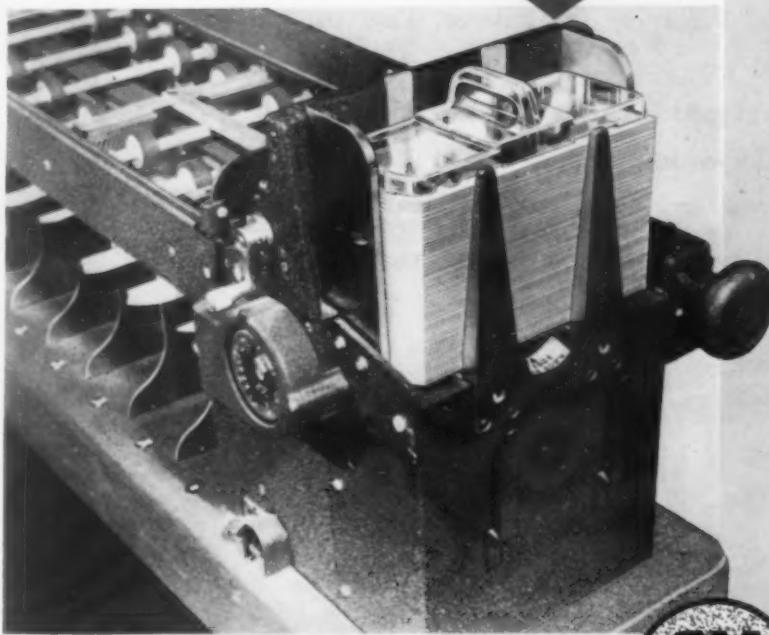


FLOW TESTERS: Both Olson-Bakelite and Parallel Plate available. Curves can be conveniently charted on the flow characteristics of thermo-plastics and thermo-setting materials.

DILATOMETER: Apparatus for determining the linear coefficient of expansion.



It takes a "Steady Hand" to hold down this Job!



Above illustration shows an IBM Electric Punched Card Sorting Machine with cards stacked for automatic sorting. Note plastic Card Weight in its steadyng position on top of stack.

**CARD WEIGHT...**  
A solid, injection-molded block of clear polystyrene measuring 3 1/4" x 7 1/4". Stepped wall thicknesses are 9/16" and 3/8". Undercut handle extends 1" above center wall step.

*This Approved Plastic Part's Required Qualifications Also Emphasized*

### CLARITY • TOUGHNESS ECONOMY

This part is a Card Weight . . . molded of clear polystyrene. It was designed by and processed for International Business Machines Corporation, Endicott, New York.

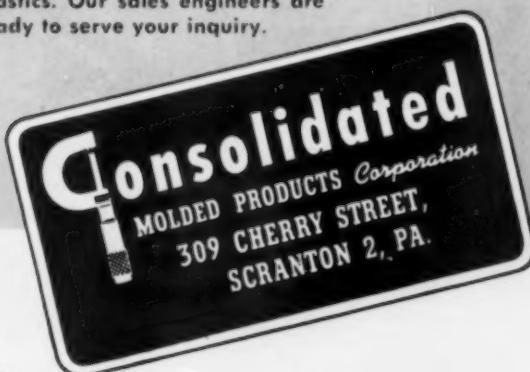
It is used as a "steadyng hand" in the hopper of an automatic card feed on a business machine.

The transparency of the selected material lends itself to viewing the stacked cards. Its toughness makes it practically unbreakable. Carefully engineered mold construction produced the handle undercuts and recesses in one operation—most economically!

This plastic part, which has so completely satisfied its end-use requirements, exemplifies the type of molding in which Consolidated excels. We are confident that our broad experience and know-how can be advantageously applied to your particular planning in plastics. Our sales engineers are ready to serve your inquiry.



Your Blue Print in Plastic



Branches: NEW YORK, 1790 Broadway • CHICAGO, 549 W. Randolph St. • DETROIT, 550 Maccabees Bldg. • CLEVELAND, 4614 Prospect Av. • BRIDGEPORT, 211 State Street.  
PRODUCT DEVELOPMENT • MOLD DESIGN • MOLD CONSTRUCTION • PLUNGER MOLDING • TRANSFER MOLDING • INJECTION MOLDING • COMPRESSION MOLDING

## SHAW CAN MOLD KEL-F

**Kel-F**, a high temperature thermoplastic, offers important advantages not available in conventional materials. We are pleased to announce the development of a molding technique which enables you to apply these advantages to your products. Here are some facts about Kel-F.

Kel-F can be used continuously at temperatures as high as 200° C or as low as -273° C. It is suitable for some short time applications as high as 250° C. Insoluble in all solvents, Kel-F is immune to oxidizing or corrosive reagents. Not even such potent reagents as aqua regia, white fuming nitric acid or boiling sodium hydroxide affect it.

In addition, Kel-F has desirable electrical properties for low loss applications. Its physical characteristics are satisfactory for most products.

You may have a problem now which cannot be solved with available plastics. Kel-F may be the answer. The cost for Kel-F at present is \$26.00 per pound; its future cost depends upon the volume uses developed for it. No matter how difficult your problem, we shall welcome inquiries. We have special molding facilities for Kel-F and engineers to solve the toughest assignment.



### SHAW INSULATOR COMPANY

160 COIT STREET

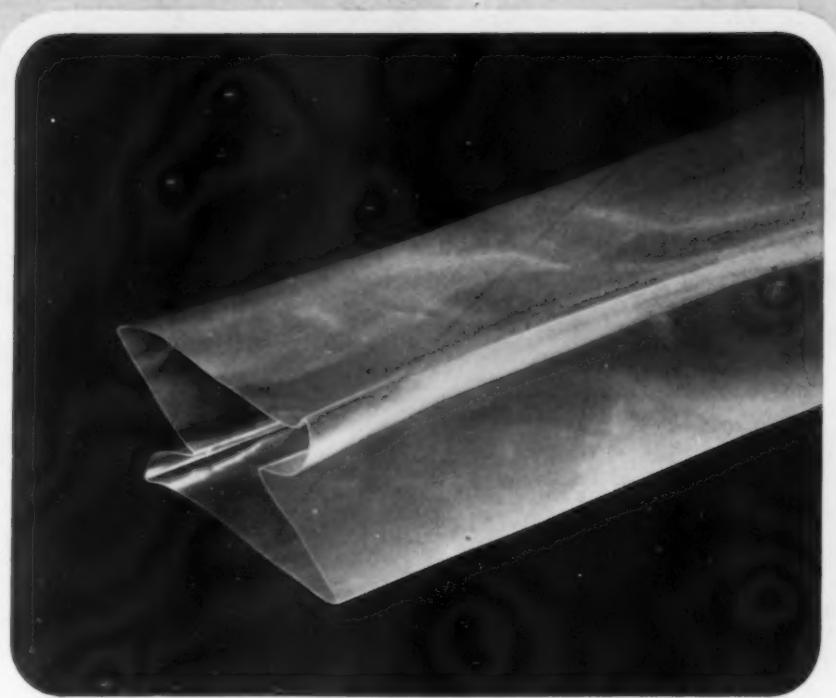
MOLDERS



IRVINGTON 11, N. J.

SINCE 1892

• NOW "IT" COMES WITH A GUSSET •



"It" is Plax Polyethylene Layflat Tubing. And it has the added advantage of being gusseted for even easier application as a tough, protective bag, pouch or envelope.

Seamless, flexible, non-toxic, Plax gusseted Polyethylene Layflat Tubing can be cold-stretched several hundred per cent.

Moisture-proof and chemically inert, it makes an excellent package for everything from food to corrosive chemicals.

Produced in continuous lengths for ready adaptation to packaging lines, this new type of Layflat Tubing is available in many colors. Please write Plax for complete details.

#### CHART ON "HOW TO USE PLASTICS"

Now available for the asking is a table of properties for six materials available from Plax in various forms and formulae. This has been incorporated in the Plax catalog, which also contains helpful information on the primary uses of each material.

A copy will be sent promptly upon receipt of your request.

Between the resources of Shaw Insulator Company, Irvington 11, N. J., and Plax Corporation, Hartford 5, Conn., you can find help on virtually every material and method in plastics today.



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In Canada - Canadian Industries, Ltd., Montreal



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EXECUTIVE CHAMBERS  
DENVER

WILLIAM LEE KNOUS  
GOVERNOR

To American Industry:

Look long at Colorado.

A vigorous, young state, awake to its opportunities yet aware of its needs, will challenge your attention and stimulate your imagination.

Natural resources we have in abundance with the water and power for their development. Our labor force is highly adaptable, our markets are rapidly expanding.

Our health-giving climate, our scenic setting make Colorado a soul-satisfying home for you and your families.

And most important — we know where we're going! Our leaders in business, industry, agriculture and education, through their Resources Development Council, are charting a course toward a sound, stable future for our people.

Look long at Colorado — it offers you much!

*Lee Knous*  
Governor



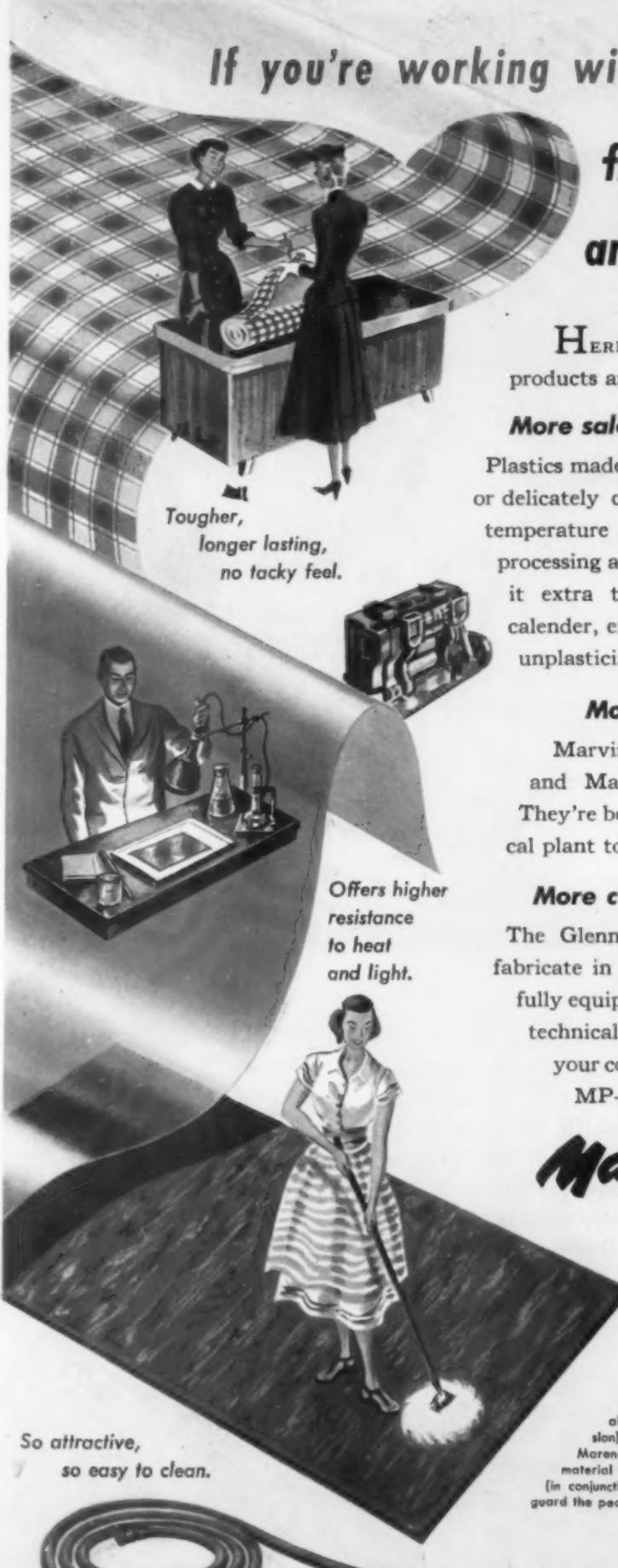
Lee Knous

\* One of a series of advertisements based on industrial opportunities in the states served by Union Pacific Railroad.

Unite with Union Pacific in selecting sites and seeking new markets in California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, Oregon, Utah, Washington, Wyoming.

\*Address Industrial Department, Union Pacific Railroad  
Omaha 2, Nebraska

**UNION PACIFIC RAILROAD**  
*Road of the Daily Streamliners*



# If you're working with **VINYL RESINS** find out why manufacturers are turning to **MARVINOL®**

HERE'S why manufacturers of plastic or elastomeric products are specifying Marvinol...the better vinyl resin!

#### **More sales appeal!**

Plastics made from Marvinol may be transparent, brilliantly or delicately colored...are easily cleaned, have greater low temperature flexibility. Marvinol offers superior stability in processing and in end product. High molecular weight gives it extra toughness and "dryness," yet it is easy to calender, extrude, injection mold, disperse or process into unplasticized rigids.

#### **More uniformity!**

Marvinol resins are a development of Martin research and Martin's quarter-century of plastics experience. They're being produced in the world's most modern chemical plant to assure you of unexcelled uniformity.

#### **More cooperation, too!**

The Glenn L. Martin Company does not compound or fabricate in the plastics field. Martin sales engineers and a fully equipped customer service laboratory offer maximum technical cooperation. For further information, write on your company letterhead to: Chemicals Division, Dept. MP-8, The Glenn L. Martin Co., Baltimore 3, Md.

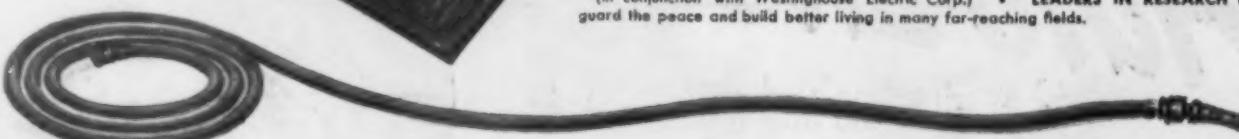


**Martin** **Marvinol**

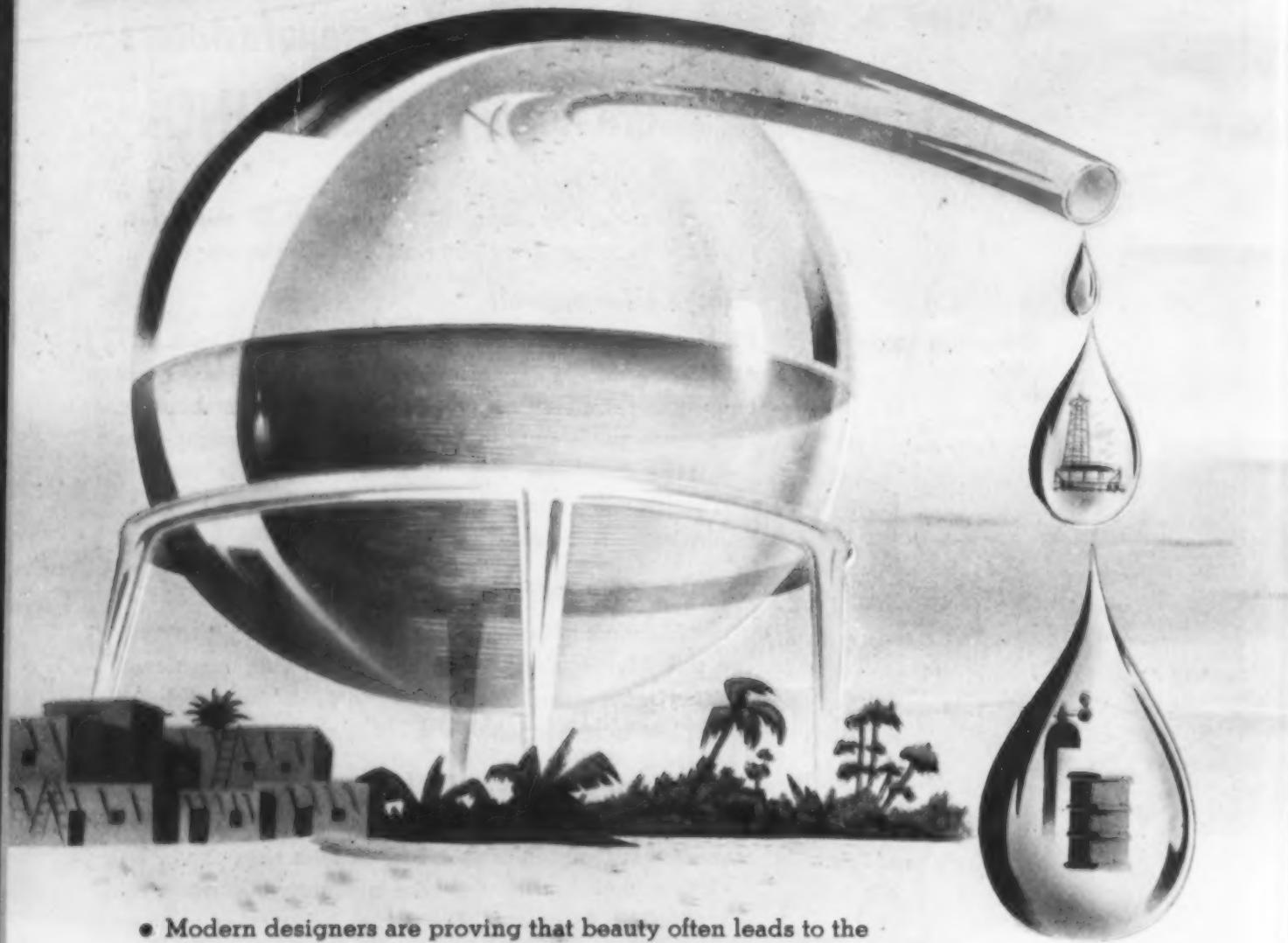
Resins, Plasticizers and Stabilizers, Produced by the Chemicals Division of  
**THE GLENN L. MARTIN COMPANY—**  
**AN INTERNATIONAL INSTITUTION**  
"Better Products, Greater Progress, Are Made by Martin"

**MANUFACTURERS OF:** Martin 2-0-2 airliners • Advanced military aircraft • Aerial gun turrets • Marvinol resins (Martin Chemicals Division) • **DEVELOPERS OF:** Rotary wing aircraft (Martin Rotowings Division) • Marcon fuel tanks (licensed to U. S. Rubber Co.) • Honeycomb construction material (licensed to U. S. Plywood Corp.) • Stratovision aerial re-broadcasting (in conjunction with Westinghouse Electric Corp.) • **LEADERS IN RESEARCH** to guard the peace and build better living in many far-reaching fields.

So attractive,  
so easy to clean.



# Quintessence of Utility



• Modern designers are proving that beauty often leads to the ultimate in utility. This new trend is finding full expression at Auto-Lite's great Bay Manufacturing Division in Bay City. Here under one roof are the technical skills and production capacity for a new art rendered in plastics including brilliantly colored elastomeric plastics, decorated metals and metal-plastic combinations. The artistic skill of Auto-Lite's Art and Style Division is available on matters of design and development.

**THE ELECTRIC AUTO-LITE COMPANY**

*Bay Manufacturing Division*  
723 New Center Bldg., Detroit 2, Mich. • Bay City, Mich.

**Auto-Lite**  
plastics and metals



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*Padobough*



YOU  
SPECIFY

...We build

In designing and building hydraulic presses, we like to work from the start with the customer's technicians. In this way we are better prepared to incorporate all the essential details that are needed in each press.

You specify—we do the rest. A Bethlehem-built press can be furnished equipped as you want it—with or without self-contained or separate hydraulic power system; with or without pumps, accumulators, intensifiers, etc.

If you are planning new presses for plastics, wall-board, fiber board, vulcanizing, metal-forming, or other applications, let a Bethlehem engineer talk things over with you. We are equipped to handle the job to your entire satisfaction.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by  
Bethlehem Pacific Coast Steel Corporation

Export Distributor: Bethlehem Steel Export Corporation

**BETHLEHEM**  
*Custom-Built*  
**HYDRAULIC**  
**PRESSES**





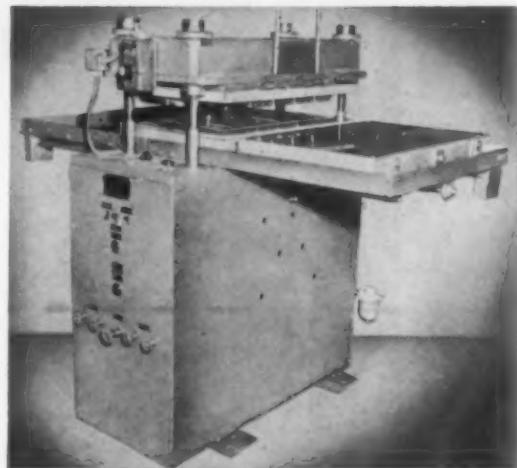
2400 of these  
per hour!

made on  
**VULCAN SUPER SPEED  
HEAT SEALING EQUIPMENT**

You'll be amazed at the tremendous output of Vulcan Compression Heat Sealing Equipment. Production of 200 dozen finished units per hour is not unusual for small articles such as this powder puff case.

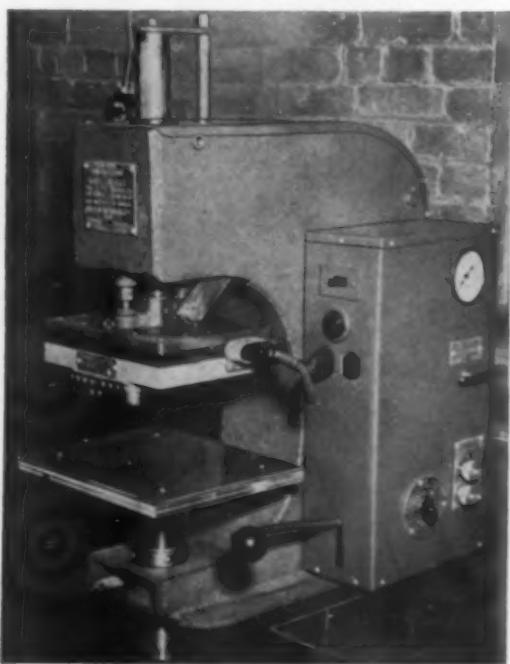
Vulcan Sealers bond all thermoplastic films including vinyl and polyethylene rapidly and securely by direct application of heat and pressure. They use low cost dies which seal and trim plastic in one quick, clean operation. Insertion of "butterfly type" valves in inflatables can be accomplished at the same time.

All Vulcan Sealers are of substantial construction and performance tested design. They are priced so low even small and medium size manufacturers can afford them. Write today for complete details and specifications.



**SERIES 2B** — 2 models, 18" x 28" Dual Platen. Unique sliding platen design allows 2 operators to use sealer alternately from either side and achieve extremely high production.

**SERIES 3B** — 4 models, 6" x 8" to 12" x 17". Compression heat seals flexible and rigid thermoplastic materials. Die cuts and seals plastic sheeting. Laminates thermoplastic sheeting to cloth.



ONLY A SINGLE OPERATION TO MAKE:

- inflatable toys • pillows
- baby pants • wallets
- medical rings • pouches

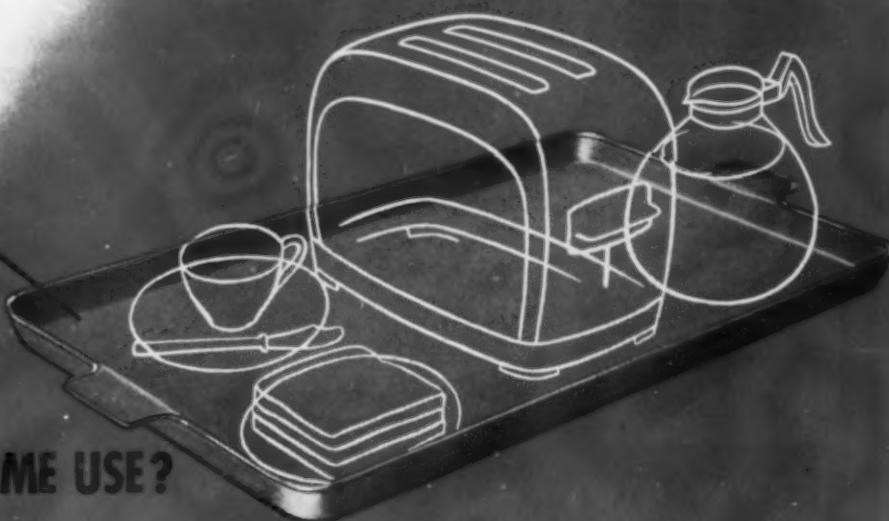


**VULCAN METALCRAFT**  
*Limited*

193A King Street, E.

Toronto, Canada

Where will  
KYS-ITE  
be used  
NEXT?



TOASTER TRAY FOR HOME USE?

Business Machine Housing?

Tote Tray for Factory Assembly Work?



**G. E. SAID O. K.**

For the cover assembly of their new portable radio, General Electric picked KYS-ITE. It makes possible sections of varying thickness . . . incorporating permanent metal inserts . . . is dimensionally stable, a non-conductor. And for all its strength, exceptionally light. Added plus: KYS-ITE's smart good looks for sales appeal.

Whether you're a manufacturer or designer, the next move is yours! Consult with Keyes engineers—discuss your plans with men who have successfully completed jobs after other molders said, "Can't be done".

KYS-ITE takes top honors in these competitive days . . . by offering a combination of advantages no other type of material can muster . . . advantages which put the ultimate consumer in a buying mood . . . making extra sales for KYS-ITE molded products.

**KYS-ITE combines:**

**Great Strength • Light Weight**

**Versatility • Resistance to Wear**

**Handsome Appearance: Color Integrity**

**Non-Conductivity: Good Dielectric Properties**

Call on our experience in custom molding to specifications. We're at your service—whatever your problem may be.

KEYES FIBRE COMPANY  
420 Lexington Avenue  
New York 17, New York  
Plant at Waterville, Maine

**KEYES**  
MOLDED PRODUCTS

**KYS-ITE**  
Reg. U. S. Pat. Off.

**Preformed Plastic Combining Long-Fibered Wood Pulp and Synthetic Resin**

Industry's most Versatile Heaters

**CHROMALOX**  
**ELECTRIC**  
**Strip Heaters**

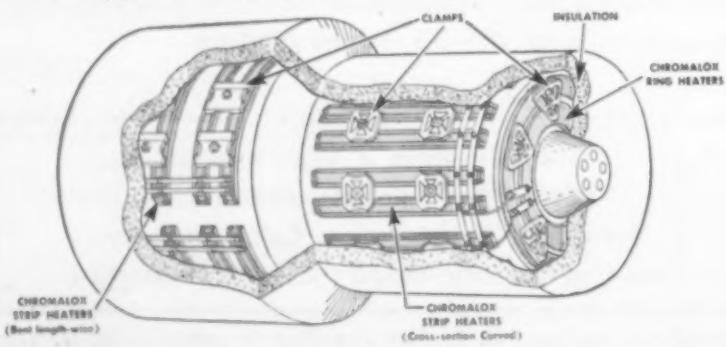
FOR USE ON FLAT OR CURVED METAL SURFACES  
WHERE CONCENTRATED HEAT IS REQUIRED

Rugged CHROMALOX Electric Strip Heaters can be clamped to tanks, platens, dies, molds; to vats, rolls, barrels, cylinders; to pipes, tubes, air-ducts, etc.—and bent lengthwise or on radius.

Simple to install, economical in operation, they give clean, dependable, accurately controlled heat when and where you need heat for product or process.

Discuss your requirements with a CHROMALOX Application Engineer. He will show you how CHROMALOX Electric Heat will save time, improve production and increase efficiency in your plant.

A Typical Chromalox Strip Heater Application



These easily installed Chromalox Strip Heaters assure accurate temperature control, dependable around-the-clock service.

**CHROMALOX**  
Electric Heat for Modern Industry

EDWIN L. WIEGAND CO.

7503 THOMAS BLVD., PITTSBURGH 8, PA.

For the full story  
of Electric Heat

"The Fastest Growing  
Industrial Tool"



See your Chromalox  
Application Engineer

Thousands of industrial plants—faced with increasing operating costs—have turned to efficient and dependable electric heat. Chromalox Application Engineers have assisted many plants to make time and money saving installations.

Chromalox Application Engineers, located in 35 key cities, will gladly work with you too, in helping modernize your production facilities where heat is needed. These men can give you expert technical assistance—backed by years of experience—and show you how your heating operations can be made more efficient and more dependable at lower cost and less maintenance.

So, if you use heat in any form in your plant for production and processing, take advantage of Chromalox "on the job" assistance and recommendations. Phone, wire or write today; there is no obligation.

Get this Booklet!

It contains a wealth of application ideas you can use in your plant . . . and lists the names and addresses of Chromalox Application Engineers serving you. Write for your copy today.



# ONLY PHILLIPS RECESSED HEAD SCREWS

HAVE THESE JOB-PROVED MECHANICAL ADVANTAGES

RECESS EDGE  
IS  
ROUNDED AT TOP



WIDER OPENING  
AT  
RECESS CENTER



RECESS WALLS  
HAVE  
MINIMUM TAPER



Prevents pushing up burrs because contact with driver begins just below top surface of screw head. Easy for driver to "ride in" to a firm seat, without excess strain on driver.

Absence of sharp corners provides wider center opening. This recess shape aids self-centering of driver. It also permits driving tool contour that insures maximum strength.

Steep walls resist tendency of driver to ride or "cam" out of recess. Consequently, less end thrust is needed at any torque. Driver seats fast—stays seated.

THAT HELP ANY WORKER SPEED DRIVING—AVOID WASTE



Makes every second count. Won't take time to fuss with finicky recess designs. Wants Phillips' fast, easy "ride-in" to a firm seat without burring—to gain time for more production.



A little "heavy-handed". Hates driver "skids" because he knows their cost in delays and damage. Wants Phillips' automatic self-centering—knows it prevents "skids". Likes rugged Phillips' driver tips.



Wants to learn fast to work fast. Needs assurance of easier fit of driver in Phillips Recess. Can expand effort in turning screw, not in holding driver in recess. Avoids "skids" that gouge work or hands.

ANY TYPE OF WORKER on any assembly will find the Phillips Recess mechanically right for fast, trouble-free screw-driving, and for driving tool economy. Top skilled workers might gain some advantage with any type of cross recess. But many are not top skilled.

The Phillips Recess is designed so no concessions in driving skill are needed. It is engineered for *practical production driving*, and its job-proved design is one of the five essentials of a standard cross recessed head screw. Make sure you get all five...specify Phillips.

GET ALL THE ADVANTAGES OF ASSEMBLY  
WITH CROSS RECESSED HEAD SCREWS...

## GET PHILLIPS Recessed Head SCREWS

Wood Screws • Machine Screws • Self-tapping Screws • Stove Bolts

American Screw Co.  
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27 SOURCES

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Shakeproof Inc.  
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The Steel Company of Canada, Ltd.  
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Stronghold Screw Products, Inc.  
Wales-Beech Corp.  
Wolverine Bolt Company

GET THIS NEW BOOKLET of facts that prove the top value, top economy of Phillips Recessed Head Screws. It's free...use the coupon.

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c/o Norton-Noyes Co.  
1800 Industrial Trust Bldg.  
Providence, R. I.

Send me the new booklet—"How to Select Recessed Head Screws for Practical Production Driving".

Name \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

MP-32

for Lower  
Compound  
Costs...

# SHELL DUTREX

**SHELL DUTREX 20 and 25**  
...for Flexible Stocks

**SHELL DUTREX 21**  
...for Molding Compounds

**SHELL OIL COMPANY, Incorporated**

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100 BUSH ST., SAN FRANCISCO 6, CALIF.



**ASK  
STOKES**

## **DESIGN for Freedom from High Labor Cost**

**D**ESIGN for plastic production to save on material and machining. Design for automatic molding to reduce operating-time to the vanishing point.

Ask Stokes' engineers to help you at every point of planning; they have 20 years experience in plastic molding.

Expect long life, low cost, high production from Stokes Plastic Molding Machines, for this is the record of thousands of them throughout the world.

Especially, look to Stokes' engineers for authoritative recommendations on procedure, and on the type of equipment to be used. Stokes makes *every* type of Compression Molding Machine.

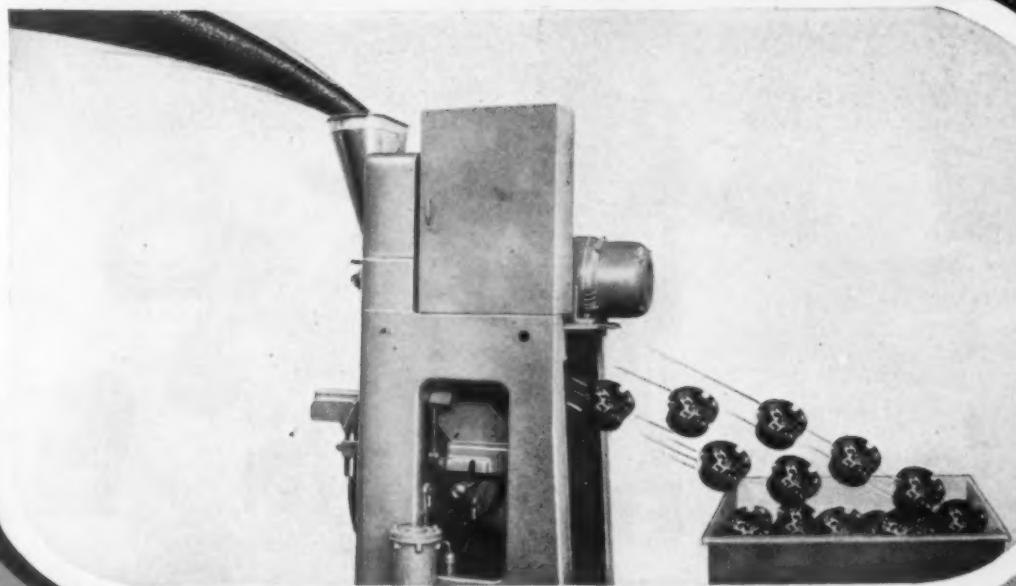
In addition to complete press service Stokes will supply product cost studies, and make or advise on mold design. Stokes breaks in new molds for automatic presses and sets machines for production . . . sends demonstrators to your plant to help train men for most profitable operation of Stokes Presses.

Stokes makes Semi-Automatic Plastic Molding Presses, Preforming Presses, Plunger Presses, Powder Metal and Ceramic Presses, Vacuum Pumps and Gages, High Vacuum Processing Equipment, Special Machines.

F. J. Stokes Machine Company,  
5934 Tabor Road, Phila. 20, Pa.



**"FEED 'EM AND REAP"**



**STOKES** *KNOWS HOW*

ASK  
STOKES

## Plunger Molding at a Profit... Efficient and Adaptable, too!

NEW models of 200 and 300-ton capacity supplement the smaller models of 50 and 150 tons capacity in the Stokes line of efficient high-speed Plunger Molding Presses.

With greater capacity to meet the growing demand of Plunger Molding users, Stokes has combined all the advantages of earlier successful models.

Operation is automatic except for loading and unloading. The patented Stokes Automatic Cycle Controller saves seconds on every cycle . . . gives more heats per hour . . . and provides finished parts of superb quality.

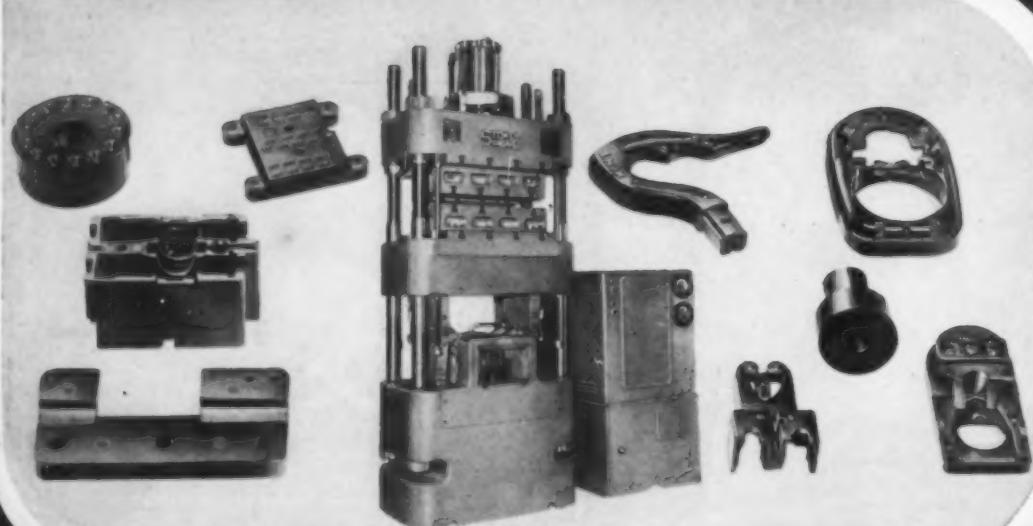
Users find that the "toggle-lock" design assures positive clamping of the mold against the pressure of the transfer cylinder . . . a principle proved in thousands of injection molding machines. Then, too,

the toggle-lock design, which eliminates the need for high pressure on Stokes machines, cuts power and maintenance costs to rock-bottom.

Two individual pumps provide independent control of clamping and plunger pressures. Adjustments are simple, and easily compensate for changes in temperature of preforms and size of sprues. Changeover from plunger to compression molding is accomplished by a simple controller adjustment.

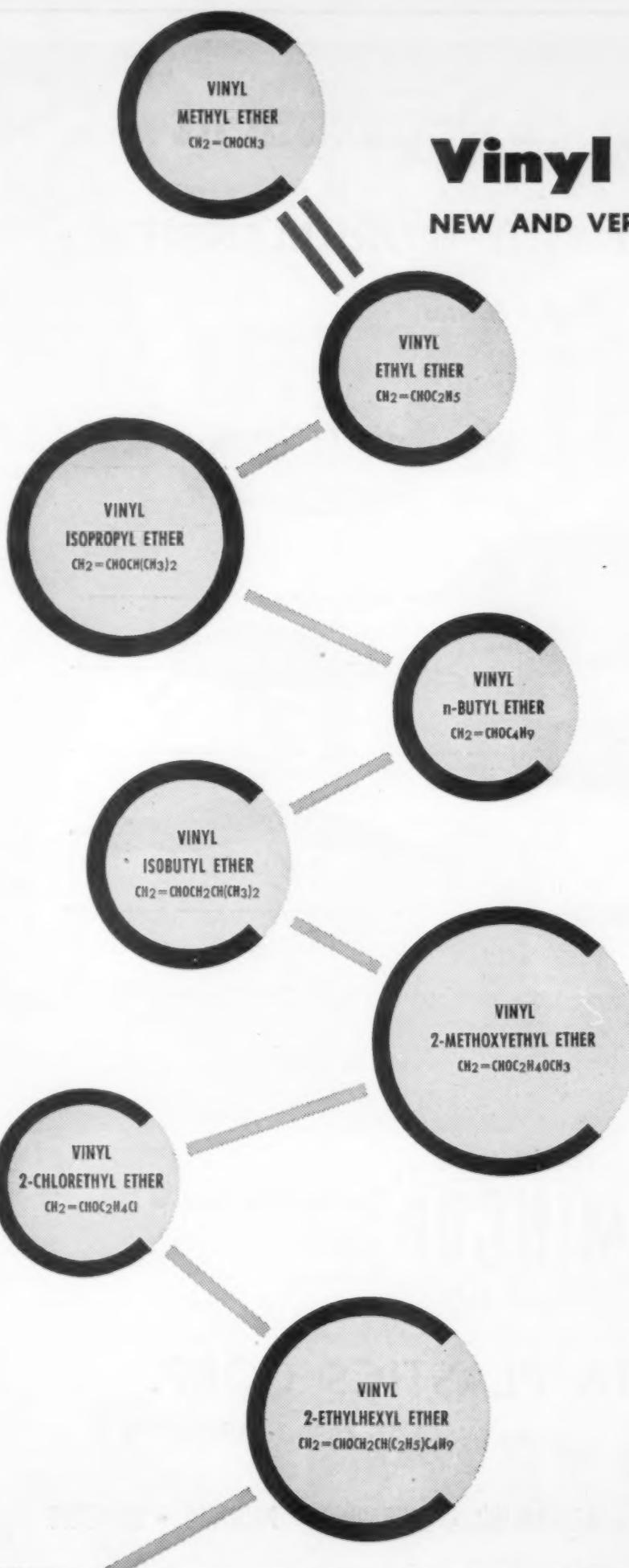
Stokes makes Semi-Automatic Plastic Molding Presses, Preforming Presses, Plunger Presses, Powder Metal and Ceramic Presses, Vacuum Pumps and Gages, High Vacuum Processing Equipment, Special Machines.

F. J. Stokes Machine Company,  
5934 Tabor Road, Phila. 20, Pa.



# STOKES

KNOWS  
HOW



## Vinyl Ethers

NEW AND VERSATILE CHEMICALS BY **CARBIDE**

Completely new fields of synthetic chemicals, polymers, and copolymers are opened with these versatile vinyl ethers. Vinyl ethyl ether is now available in drums and the other seven ethers can be supplied promptly in less-drum quantities.

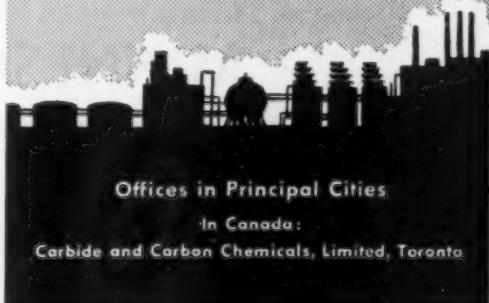
Vinyl ether boiling points range from 6° C. to 177.5° C. They can be polymerized in either the liquid or vapor phase. With other monomers, copolymers are obtained. These vary from hard resins to soft, internally plasticized compounds, valuable for coatings, films, and molding and casting resins.

Vinyl ethers react with the hydroxyl groups of cellulose and other polyhydroxy compounds to yield mixed acetals having good water and alkali resistance. The vinyl ethers are also intermediates for novel products such as methyl ethyl pyridine, 1,2-dichlorethyl alkyl ethers, and 2-alkoxy propionitrile.

The vinyl ethers can be produced readily in large industrial quantities. For samples, prices, and additional data, write to Carbide and Carbon Chemicals Corporation, 30 East 42nd Street, New York 17, N. Y. Please address Dept. L-8.

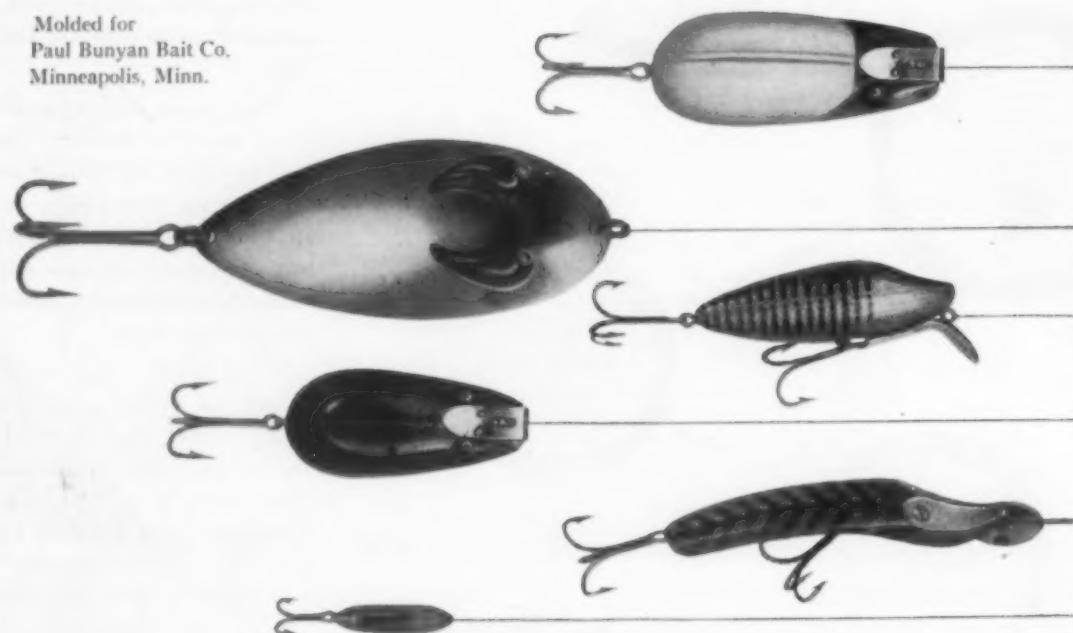
### CARBIDE and CARBON CHEMICALS CORPORATION

Unit of Union Carbide and Carbon Corporation  
30 East 42nd Street **WE 5** New York 17, N. Y.



“Your Plastics Department”  
*Presents*  
**EXAMPLES OF FINE WORKMANSHIP**  
*\*6 of a Series*

Molded for  
Paul Bunyan Bait Co.  
Minneapolis, Minn.



The famous Paul Bunyan baits, designed for particular fishermen, are molded with the utmost care and precision.

The same skillful services of our tool room and molding plant are available to you here at “Your Plastics Department.”



**MINNESOTA PLASTICS CORP.**

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ST. PAUL 1, MINNESOTA

INJECTION MOLDING • FINISHING • ASSEMBLING • PACKAGING • PRINTING • PAINTING

# VINYL INKS

BY

# STANLEY

*Is your problem one of decorating Vinyl film or Vinyl coated fabrics?*

Stanley offers Vinyl Inks specially developed for rotogravure and silk screen processes. Stanley's research staff and unexcelled facilities are available to help you with your special Vinyl printing problems. Write for further information to Stanley Chemical Company, East Berlin, Conn.



## STANLEY CHEMICAL

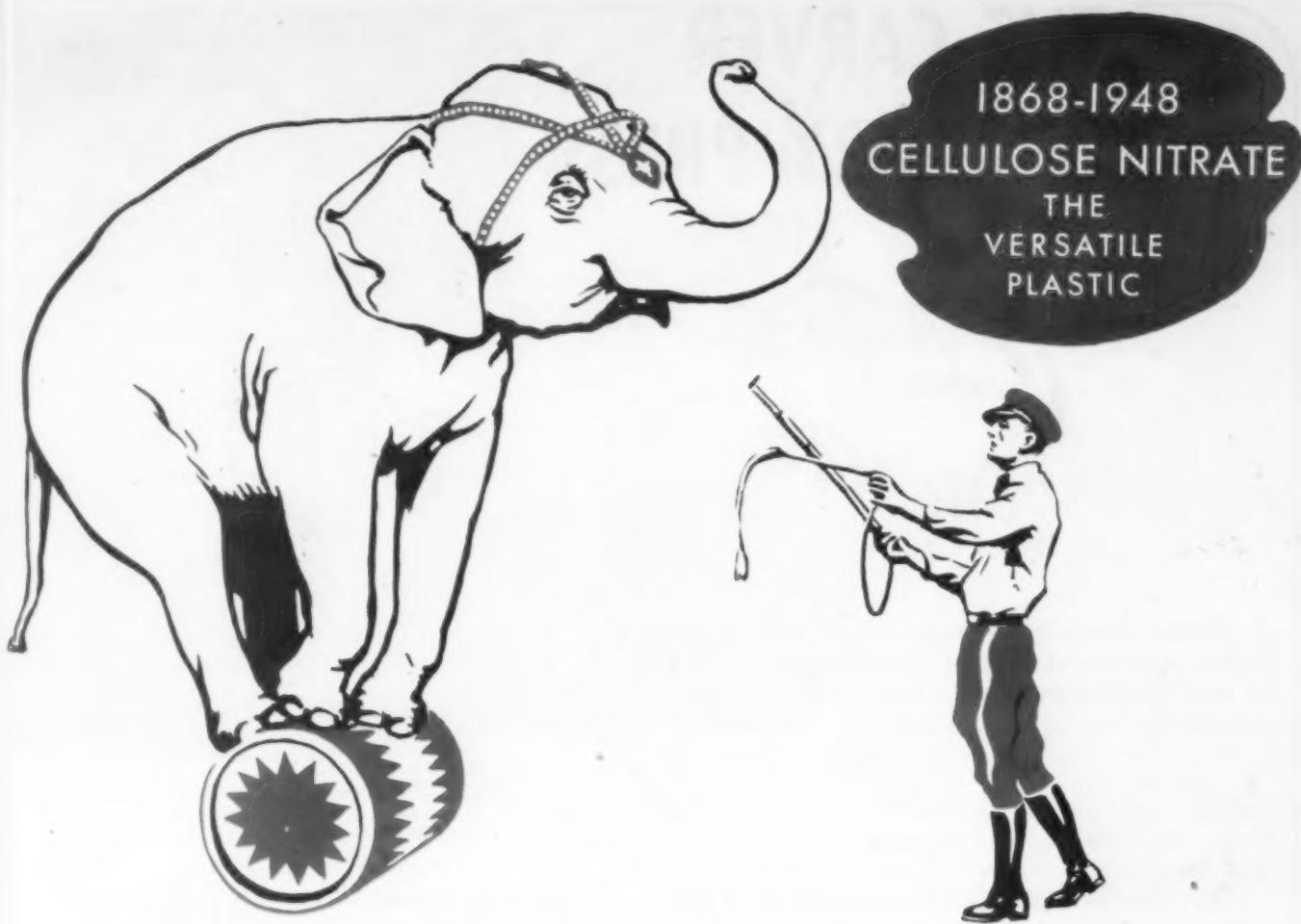
INDUSTRIAL COATINGS

LACQUERS      SYNTHETICS      JAPANS      ENAMELS

# INDUSTRIAL MOLDING

Cruver is proud of its selection by Motorola Inc. as molder for the two portable model Plastic radio cabinets and the television front shown in the illustration herewith.





# TOUGH BUT ALSO ADAPTABLE

**NIXON**  
C/N  
CELLULOSE  
NITRATE

One of the most interesting things about Nixon C/N (Cellulose Nitrate) is the way it lends itself to different jobs. You can use it for a fragile hosiery form or for a mallet head which takes a lot of pounding. It adapts itself to both applications equally well. Nixon C/N is easy to use and economical too. It is priced so moderately that you can use it for any plastic application. Consider Nixon C/N (Cellulose Nitrate) . . . Nixon C/A (Cellulose Acetate) . . . Nixon E/C (Ethyl Cellulose) for any job involving plastic materials. These Nixon Plastics are available in Sheets, Rods, Tubes, and Extruded Shapes. Molding powders are available in Nixon C/A (Cellulose Acetate) and Nixon E/C (Ethyl Cellulose).

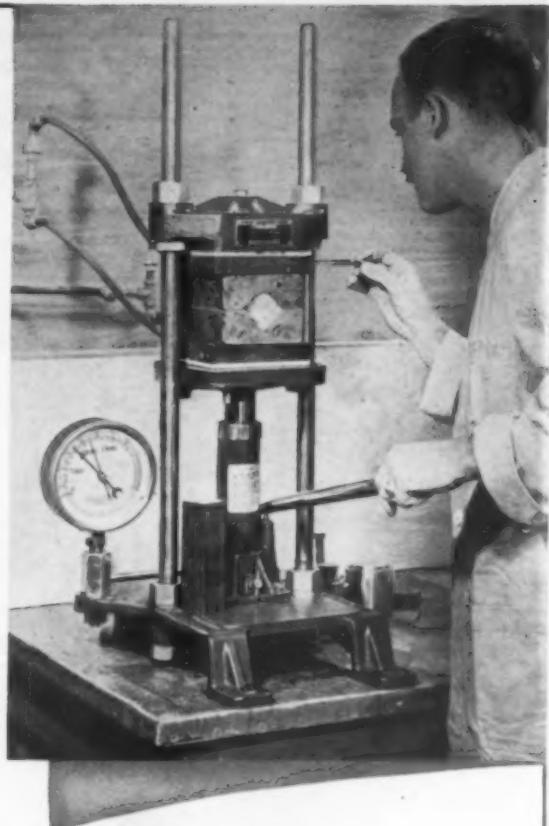
**NIXON NITRATION WORKS • NIXON • NEW JERSEY**

Representatives: New York, Chicago, Detroit, St. Louis, Leominster • Sales Agents: NORTHWEST PLASTICS INDUSTRIES: Portland, Oregon; Seattle, Washington  
Canadian Distributors: CRYSTAL GLASS AND PLASTICS, LTD., Toronto, Can. • Export Distributors: OMNI PRODUCTS CORP., 460 4th Ave., N.Y. 16, N.Y.

# THE CARVER LABORATORY PRESS

*CLP's  
in use*

Through experimental work shown in progress on this Carver Laboratory Press, the Timber Engineering Company has developed a method for producing shatter-proof desk legs . . . . .



"We use the Carver Press for nearly all of our preliminary testing work, to secure basic data. It is essential in our laboratory," says Mr. C. A. Rishell, Director of Research for Timber Engineering Company, Washington, D. C.

"Our Carver Press permits us to test small quantities of material faster and at less cost than would be possible on larger equipment. "The speed with which this press can be heated

and put into operation reduces preparation time to minutes.

"It also gives us compact, mobile facilities for hot plate pressing in demonstrations of processes. The press is shipped to various cities for research meetings. Recently, at one of these, we equipped a small laboratory on the stage. The Carver Press was one of the most valuable pieces of equipment at this session."

Small, but powerful, the Carver Laboratory Press is standard equipment for laboratory research and development. The Press is a complete self-contained hydraulic unit. Accurately controlled pressures to 20,000 lbs.; 6-inch gauge rigidly mounted on base. Carver Standard Accessories available from stock, include Electric or Steam Hot Plates, Carver Test Cylinders, Swivel Bearing Plates, Cage Equipment etc.



Write for Catalog

**FRED S. CARVER INC.**  
HYDRAULIC EQUIPMENT  
343 HUDSON ST. NEW YORK 14, N. Y.



**Look at the advantages**

**FIRE RESISTANT**

**offers you!**



There are extra selling points for you in everything you make of the new *Fire-Resistant* type of *Respoid*!

First, this type of *Respoid* is specially compounded to resist quick combustion. It will burn if held in direct contact with flame, but slowly enough to afford a high degree of safety. Samples have passed the California State Law setting the minimum fire safety standards for wearing apparel. The material has been awarded the Good Housekeeping Guaranty Seal.

Besides this important safety feature for your customers, *Fire-Resistant Respoid* is made to resist cracking, fading, scuffing and abrasion — perspiration, most acids, alcohol, alkalies, oil and grease and its lovely colors are practical anywhere because dirt can be wiped off in seconds with just a damp cloth.

With this combination of beauty, durability and safety, the *Fire-Resistant* type of *Respoid* will add new sales appeal to aprons, curtains, waterproof garments — wherever you use it. Write for samples today. Respro Inc., Cranston 10, Rhode Island.

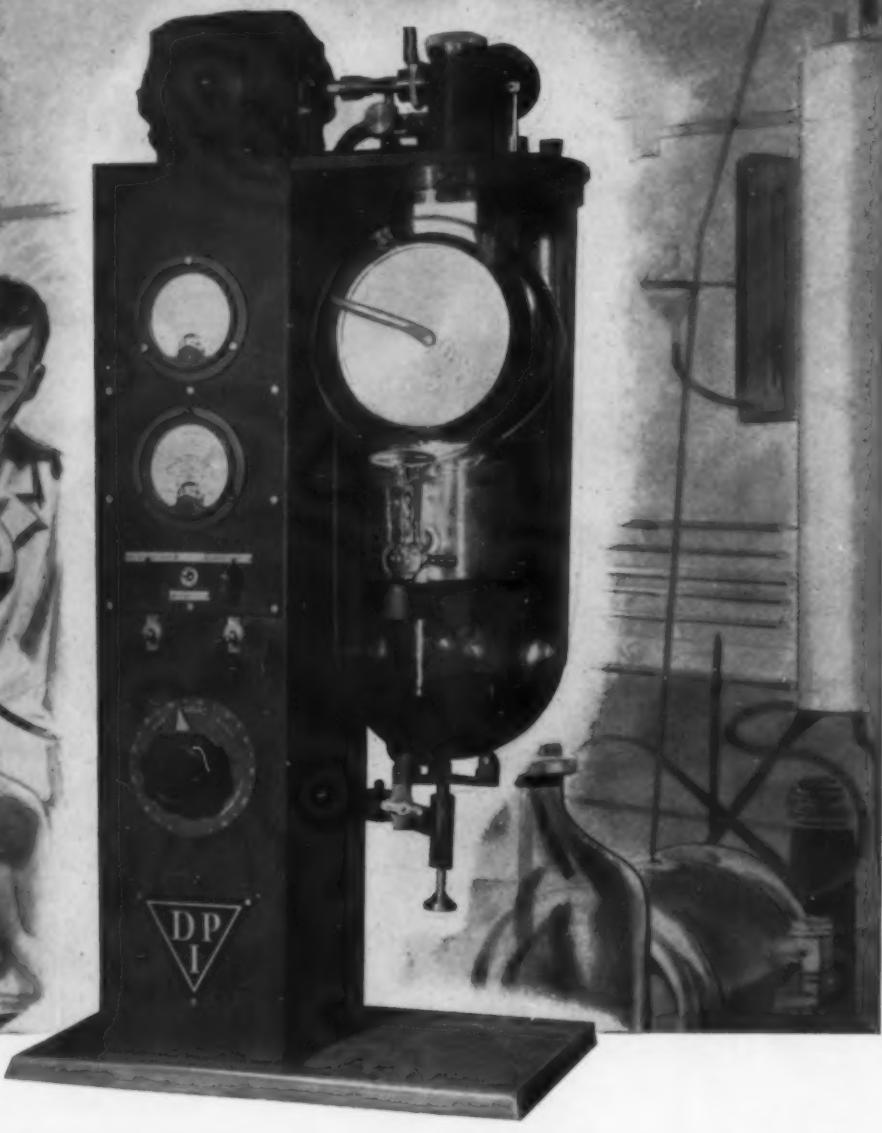
# Respoid



• Be sure to identify all your products made from the *Fire-Resistant* type of *Respoid* with the special yellow and black tag carrying the words, "Respoid — Fire-Resistant." The big *Respoid* advertising campaign in *Good Housekeeping* magazine makes it an important selling point for you.



HIGH VACUUM RESEARCH  
AND ENGINEERING



## *Somewhere a Scientist awaits this research tool*

MOLECULAR distillation now used in the separation of heavy oils once thought undistillable, in the extraction of precious drugs, vitamins and hormones, and in the processing of foods, chemicals and plasticizers is returning millions of dollars to these industries.

But there is yet a vast field to be explored.

Research men in science and industry, utilizing high-vacuum distillation, may discover many things which will prove a boon to humanity in better health and better living.

That is why DPI has brought out the CMS "5" high-vacuum centrifugal still, specifically designed for laboratory use. This compact unit, 32" high

Announcing a High-Vacuum Centrifugal Still designed especially for laboratory use. DPI now makes available an inexpensive Molecular Still for research and experimental separation and distillation of Oils, Resins, Plasticizers Drugs, Vitamins, Perfumes Extracts, Fatty Acids and Complex Experimental Mixtures

on a base 1 x 1½ ft. can rest on a lab bench. It is a precision instrument, versatile, easily operated, highly efficient in maintaining the lowest thermal

decomposition hazard so far attained.

For the express purpose of encouraging research in Molecular Distillation in university and industrial laboratories, this new lab still is offered at a moderate price.

If your processing involves the distillation of substances with molecular weights above 200, you should provide your research department with this new tool.

For further information write—

**DISTILLATION PRODUCTS, INC.**  
119 RIDGE ROAD WEST • ROCHESTER 13, N. Y.



Manufacturers of Molecular Stills and High-Vacuum Equipment; Distillers of Oil-Soluble Vitamins and Other Concentrates for Science and Industry

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## For Standard Plastics Parts, see

We manufacture and stock complete lines of plastic knobs and handles, only a few of which can be shown here. New designs are constantly being added. For catalogs, specifications, prices, or samples, write Kurz-Kasch — America's foremost source of standard plastic knobs and handles.

373

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For Over 32 Years  
Planners and Moulders in Plastics

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BRANCH SALES OFFICES: New York, Lexington 2-6677 • Chicago, Harrison 5473 • Detroit, Randolph 5214  
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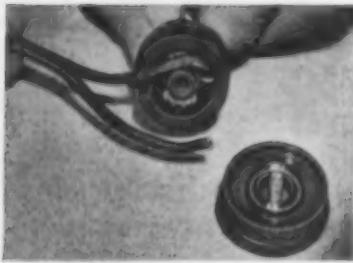


309-64-40260

# FOR YOUR INFORMATION

## Lighten your lighting problems

Lighting takes on new beauty and utility in versatile Monsanto plastics. These successful lighting applications using Monsanto plastics suggest their wide range of physical properties and sales advantages . . . at lower costs, too. If you are designing new lighting equipment or re-styling current models, look into the advantages of Monsanto plastics.



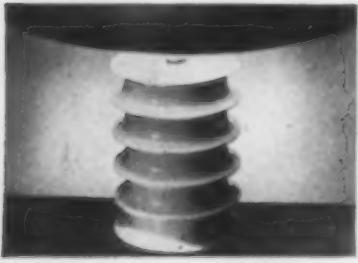
**FOR WALL PLUGS** such as this unusual design which eliminates need for stripping insulation from the wire and makes its own contact, Resinox is ideal. Molded and sold by Waterbury Companies, Inc., Waterbury, Conn.



**LIGHT WEIGHT** Lustron was selected for this large "egg crate" lighting fixture, which is easily molded, economical and nonshattering. Molded by Boco Plastic Co., Chicago. For Leader Electric Mfg. Corp., Chicago.



**HEAT RESISTANT** Lustron, Monsanto's improved thermoplastic enables these lamp shades . . . designed to fit close to the bulb . . . to withstand heat from a 75-watt bulb. Molded and sold by Rogers Plastics Corp., P. O. Box 409, Springfield, Mass.



**STURDY**, colorful Lustron, which can be readily molded for unusual shapes and decorative designs, was first choice for this lamp base. Molded by South Gate Tool Engineering, South Gate, Calif. For Excello Plastic Products, Los Angeles.



**ECONOMICAL**, providing more units per dollar Lustron is exactly suited for light weight, smartly-designed units like this clip-on lamp for reading abed. Molded by the Vichok Tool Co., Cleveland For Stapleton Industries, Inc., Cleveland 14.



**EASILY COMBINED WITH METALS** or other materials, Lustron forms the base and shade of this handsome fluorescent desk lamp. Molded by the Molded Insulation Co., Philadelphia. For Standard Business Machines, Chicago.



**DURABLE** Resinox, Monsanto's tough thermosetting plastic is specified for this bullet-shaped lamp for long-time service on the headboard of beds. Molded and sold by Eagle Electric Manufacturing Co., Long Island City, N. Y.



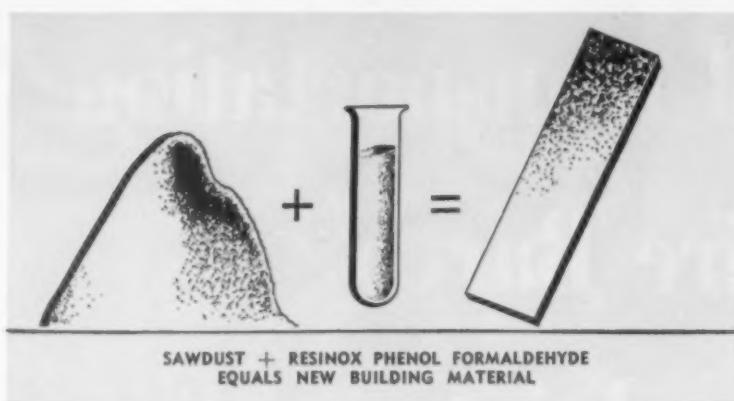
**GOOD ELECTRICAL PROPERTIES** make Lustron a perfect choice for this plug cap with blades that can be removed for easy attachment to cord. Molded by National Products Co., Kansas City. For the Sta-Tite Manufacturing Co., Kansas City.



**CLEVER DESIGNS** are neatly executed with Monsanto plastics . . . this child's night lamp of Lustron, for instance. It is colorful, transparent, durable, and easily-molded into unusual shapes. Molded and sold by All Plastics Corp., Avon-By-The-Sea, N. J.

## NEWS ABOUT PLASTICS FROM MONSANTO CHEMICAL COMPANY

AUGUST . . . 1948



### Sawdust is "Gold Dust" as new construction material

#### Tough, Light-Weight Composite Created with Resinox Binder

Sawdust is taking on new shape . . . as a strong, light-weight, economical replacement for lumber in woodworking and construction fields.

Combined with Resinox, a thermosetting resin, waste sawdust is now low-pressure molded into low-cost building material. Already successfully employed on some jobs that formerly used lumber, this new composite has exciting possibilities for many industrial applications.

Woodwork designers and manufacturers are enthusiastic about its utility for millwork, trim, interior decoration fixtures and for uses demanding strength and bulk plus dimensional stability. The non-warping, non-swelling material can be sawed, hammered or glued, and presents a smooth, easily painted surface.

Can your business use a new building material? Would you welcome a new, profitable use for wood waste? If so, this sawdust composite may allow you to get in on the ground floor with a bright idea which will mean profit-making savings for your business. Whether you design, manufacture or sell goods, here is an interesting new approach to an old problem . . . well worth investigating through the coupon below.

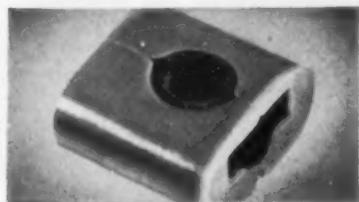
Lustron<sup>®</sup>  
Resinox<sup>®</sup> Reg. U. S. Pat. Off.



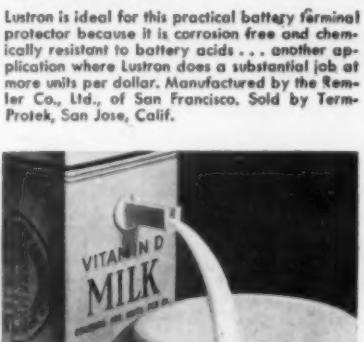
SERVING INDUSTRY...WHICH SERVES MANKIND

USE THIS COUPON TO BRING YOU PROMPTLY FULL INFORMATION ON MONSANTO PLASTICS

- MONSANTO CHEMICAL COMPANY, PLASTICS DIVISION  
Dept. MC10, Springfield 2, Mass.
- Please send me  information regarding the use of Resinox industrial resins for the utilization of wood waste.  
 general information on Monsanto's twelve basic plastics.  
Information on  Lustron  Lustrex  Resinox.
- Name.....
- Firm.....
- Address.....
- City.....
- Title.....
- State.....



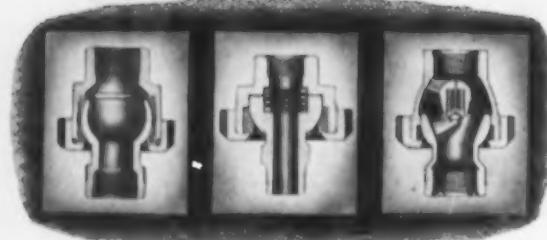
Battery terminal protector  
uses Lustron



Lustron cream separator  
for paper milk containers

Lustron is tasteless, odorless and acid resistant . . . all qualities that are a "must" for this novel design of a light weight cream separator that can be conveniently inserted into paper milk containers. Molded by Electric Manufacturing Company, Inc., San Francisco, Calif. For J. A. Danielson Company, Richmond, California.

# Many operations in industry and transportation require Barco Flexible Joints in pipe lines



For over 30 years Barco has been providing the necessary flexibility and protection for fluid lines—and today Barco is standard and universally accepted. Write for information about applications in your own particular field. Barco Manufacturing Company, 1809 Winnemac Avenue, Chicago 40, Illinois. In Canada: The Holden Co., Ltd., Montreal, Canada.

**BARCO FLEXIBLE JOINTS**

FREE ENTERPRISE—THE CORNERSTONE OF AMERICAN PROSPERITY

"MOVE IN"      "EVERY"      "DIRECTION"

*Not just a swivel joint...but a combination of a swivel and ball joint with rotary motion and responsive movement through every angle.*



how to win in a

# Breeze

Take a sound design for an electric fan. Mold the fan, base, and motor housing of high-impact BAKELITE Phenolic Plastics . . .

When Roto-Beam did this, it was able to increase sales volume and open up new markets for its silent, high-efficiency air circulator. In addition, it developed a unique, five-bladed fan which is pre-balanced with micro-motion accuracy right in the mold.

That's not all. The 10-inch propeller weighs less than 8 ounces, permitting use of a smaller motor than would otherwise be needed. It is strong and resistant to corrosion, chemical vapors and dampness. It cannot warp or rust. Its smooth, non-porous surface retards dust and dirt collection. Its clean, functional design blends with any factory, office or home interior.

Scores of manufacturers have discovered the way to win in a breeze with the economy, heat resistance, mechanical strength, dielectric properties, chemical resistance and other qualities found in BAKELITE Phenolic Plastics.

In tiny parts as in huge housings, BAKELITE Phenolic Plastics show the way to better products at lower costs. Write Department 8 for assistance of our engineers in using these materials to your advantage.



**BAKELITE**  
**PHENOLIC PLASTICS**

BAKELITE CORPORATION, Unit of Union Carbide and Carbon Corporation UCC 30 East 42nd Street, New York 17, N. Y.



**H**OW would you like to be in our shoes. When we have orders, we can't get materials. When we can get materials, the orders stay away in droves. It's enough to send a man off his rocker.

For example, right now we're up to our ears in rag-filled Melamine. O.K., so it's not suited for molding some plastic molded products. But rag-filled Melamine is really perfect for many molding applications, and it has some exceptional advantages. Like these:

1. Toughness
2. Low water absorption

3. High arc resistance
4. It can be boiled
5. It's thermo-setting

And, we know how to mold it.

That's all, brother. But it should be enough to bring you flying to Boonton if you think rag-filled Melamine can be used for molding your product.

And don't forget Boonton's engineering service! Our engineers can often simplify your piece designs to make lighter and more durable parts.

*Boonton*

MOLDERS OF MOST PLASTICS BY MOST METHODS

YOUR MOVE! WRITE OR PHONE

THE BOONTON MOLDING COMPANY  
Boonton 3, N. J. Boonton 8-2020

Monarch 74

CARBON  
BLACK ....

for PLASTICS

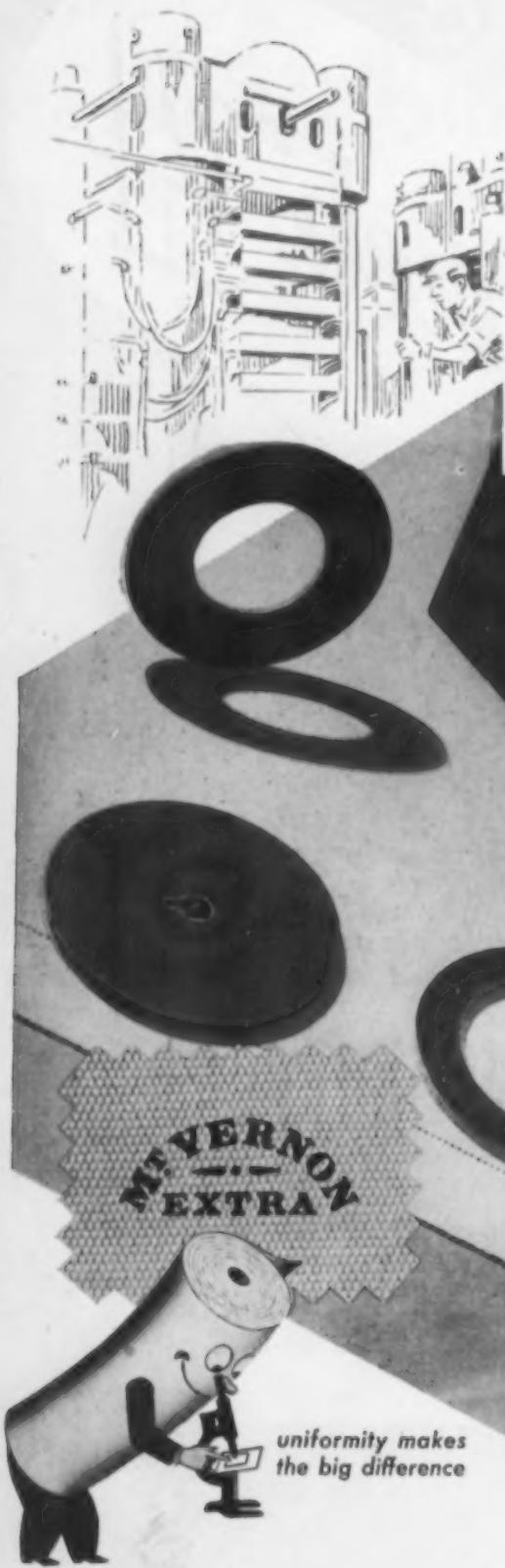
Cabot's Monarch 74 provides the intense blackness and ease of dispersion necessary to the black plastics manufacturer. Uniformity of color, low cost and availability are but a few of the favorable characteristics of Monarch 74.

**CABOT**

GODFREY L. CABOT, INC.

77 FRANKLIN STREET, BOSTON 10, MASSACHUSETTS

# Better Penetration Means Better Lamination



Men who choose laminating fabrics know the importance of even resin penetration . . . know what it means to the ultimate strength and durability of the laminates they make.

That's why Mt. Vernon Extra gets first call in their specifications. Mt. Vernon's high degree of uniformity insures uniform resin penetration . . . because Mt. Vernon fabrics are produced from top grades of cotton under rigid laboratory controls to insure successful lamination.

For laminating fabrics specifically designed to make better laminates, choose Mt. Vernon Extra.



**Mt. Vernon-Woodberry Mills**

Branch Offices: CHICAGO • ATLANTA • BALTIMORE • BOSTON • LOS ANGELES • AKRON

**TURNER HALSEY**  
COMPANY  
Selling (TM) Agents  
40 WORTH ST. • NEW YORK

# PAULITE

# the plastic that's BRIGHT at NIGHT



For the premier in luminescent plastics

use

**PAULITE PHOSPHORESCENT POLYSTYRENE**

**PAULITE PHOSPHORESCENT POLYETHYLENE**

**PAULITE PHOSPHORESCENT TENITE II\***

also

**PAULITE FLUORESCENT POLYSTYRENE**

(for use with black light)

### LONG LASTING LUMINESCENCE

Articles made of PAULITE emit a warm, friendly glow in the darkness. This after-glow lasts for as many as 10 or more hours, depending upon the intensity of activation.

### EASY TO USE

Luminescent PAULITE comes in  $\frac{1}{8}$ " to  $\frac{1}{4}$ " granules — ready for immediate molding. You handle PAULITE just as you would any other thermoplastic molding compound — it requires no special treatment before, during or after molding. All ingredients are thoroughly sealed, finished pieces have a glossy surface.

For complete information about the various varieties of PAULITE and how they can increase the saleability of your products, fill in and mail the attached coupon at once.



\*Reg. U.S. Pat. Off.

**Luminescent  
PLASTICS CORPORATION**

201 N. WELLS STREET

CHICAGO 1, ILL.

MAIL  
THIS  
COUPON  
FOR FULL  
DETAILS

LUMINESCENT PLASTICS CORP.  
201 N. Wells Street  
Chicago 1, Ill.

Gentlemen:

We're interested in PAULITE, the plastic that really glows in the dark, for molding the following items.....

Please send us detailed information on PAULITE's physical properties and colors. Include data on prices and delivery dates.

Name.....

Firm.....

Address.....

# Let Pure Nickel PROTECT YOUR PHENOL-FORMALDEHYDE PLASTICS

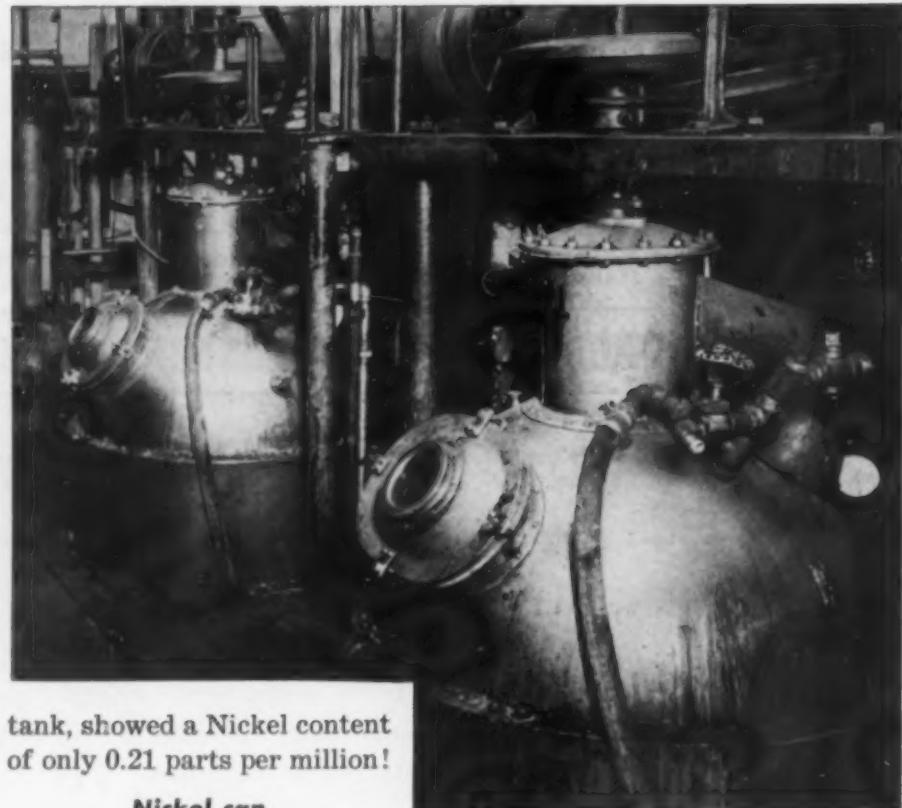
Here's why pure Nickel has been standard ever since clear, transparent plastics and resins were first produced:

Nickel's high degree of corrosion resistance keeps metal pick-up down; it assures purity, uniformity and color protection during all stages of production, handling, transportation and storage.

Nickel has good heat transfer properties, too. It finds wide application in the production of high purity phenol—stills, condensers, and reactors operating at high temperatures and pressures.

Temperatures in storage tanks, naturally, are not so high—but contact may be for long periods. Corrosion which might not damage the equipment itself to any great extent is undesirable because it means product contamination. It is here that Nickel storage tanks—as well as Lukens Nickel-Clad Steel tanks and tank cars—are exceptionally valuable.

At one large plastics plant, for example, analysis of a representative phenol sample after 28-day storage in a 10,000-gallon Nickel-Clad



tank, showed a Nickel content of only 0.21 parts per million!

#### *Nickel can*

#### *improve your product, too*

If corrosion dims the sparkle and lustre of your finished product, turn to Nickel. It has countless applications in the processing of phenolics.

Standardize on this strong, corrosion-resistant metal for your holding and mixing tanks, pipe lines and pumps... for kettles, escape lines, condensers and storage tanks.

With Nickel on the job, you can be *sure* of protection against metallic contamination.



**TYPICAL PHENOL STORAGE TANK** built of light-gauge Nickel sheet, reinforced with steel. Analysis of phenol after a month's storage showed only 0.21 parts per million of Nickel. Photo courtesy Whitlock Mfg. Co., Hartford, Conn.

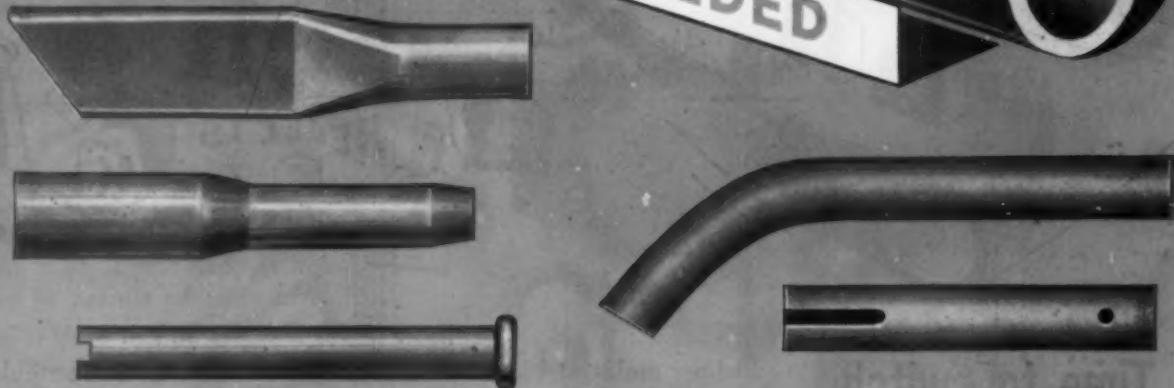
THE INTERNATIONAL NICKEL COMPANY, INC.  
67 Wall Street, New York 5, N. Y.

Standardize on **PURE NICKEL** ...where PURITY counts



YARDLEY  
"TRU-SIZE"  
TUBING

CONTINUOUSLY MOLDED



*And now* FABRICATED  
TO MEET YOUR NEEDS

Yardley was among the first to produce plastic tubing by the continuously-molded process with high precision and absolute uniformity.

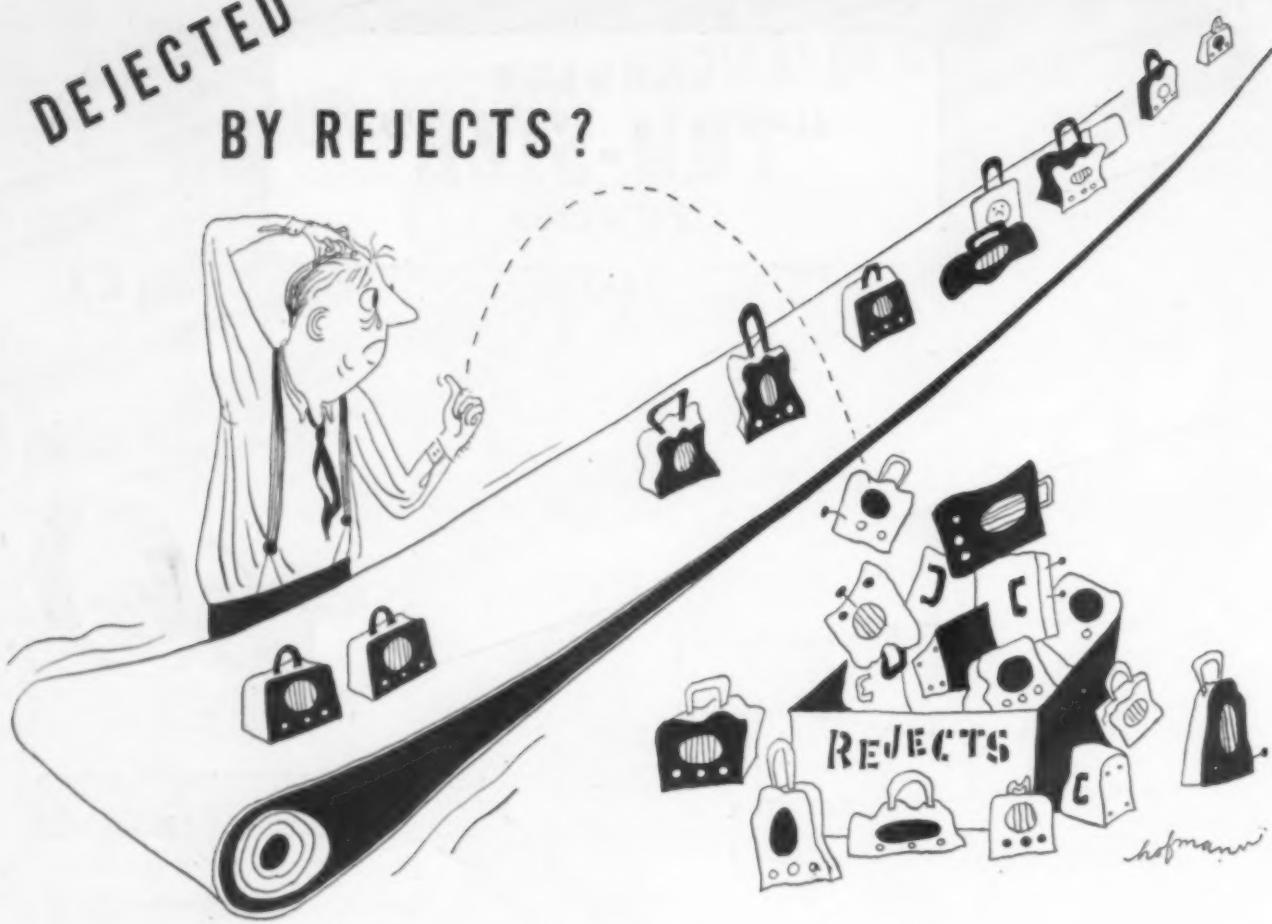
Now Yardley goes a step further to speed production and cut assembly costs. We shape, flatten, curve, swedge, drill and perform many other fabrication operations to make your plastic parts ready to use. Investigate "Tru-Size" tubing where close tolerances, high-dimensional stability, mold-like finish and high gloss are important. Standard wall thickness, O.D.  $\frac{3}{8}$ " to 2".

Tell us your problem. No obligation.

**YARDLEY** Plastics Co.

142 Parsons Ave. • ADams 9315 • Columbus 15, Ohio

DEJECTED  
BY REJECTS?



Time to switch  
to G-E Silicone  
Mold Release Agents!

Rubber molders! Plastics molders! Here's a way to cut down on reject losses. Switch to General Electric silicones for your mold release agents.

General Electric silicone oils are formulated to wet surfaces readily. They easily penetrate small cavities because of their relatively low surface tension. This prevents sticking of the binder or molded part and the mold. Reject losses are reduced and over-all production is improved.

Water-diluted silicone emulsions have been accepted by tire and rubber molders to speed their production . . . to reduce down time and rejects.

Order General Electric silicone oil #9981 LTNV-70 (low viscosity) and #81092 (high viscosity) or silicone emulsion #81024 in any quantity from pints to drums. Quick delivery. Write for more details. Chemical Department, General Electric Company, Pittsfield, Mass.

*Please address inquiries about G-E silicone oils to Resin and Insulation Materials Division, Chemical Department, General Electric Co., Schenectady 5, N. Y.*



**GENERAL**  **ELECTRIC**

CD48-AH2

say  
**"GOOD-BY"**  
 to the  
 one-job press

Standard Elmes semi-automatic-type compression molding presses are made in capacities from 100 tons, up. Furnished with or without coordinating control for high-frequency pre-heating unit. Press head is arranged to permit addition of a standard transfer cylinder later, if desired, without dismantling installed equipment.

**FOR EVERY PLASTICS MOLDER**

Complete specifications are included in 12-page booklet, "Elmes Hydraulic Equipment for the Plastics Industry." Also covered are: Transfer Presses; "Hydrolair" Pumpless, Motorless Presses; Hobbing Presses; Small-Production and Laboratory Presses; High-Pressure Pumps; and Elmes Accumulator Systems. Please ask for Bulletin 5200.

**ENGINEERED BY ELMES**

Good Hydraulic Production Equipment Since 1851



- FLEXIBLE
- CAPABLE
- FAST

ELMES ENGINEERING WORKS of AMERICAN STEEL FOUNDRIES, 225 N. Morgan St., Chicago 7, Ill.

Distributors in Principal Industrial Centers • Also Manufactured in Canada

METAL-WORKING PRESSES • PLASTIC-MOLDING PRESSES • EXTRUSION PRESSES • PUMPS • ACCUMULATORS • VALVES • ACCESSORIES



## PLASTICS GRINDERS

... more than 3,000 BALL & JEWELL  
patent ROTARY CUTTERS serve industry

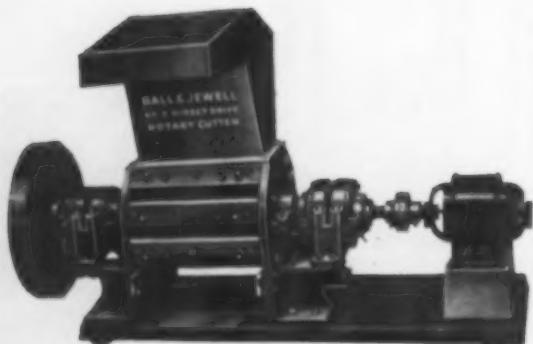


### NO. 0 MODEL

Identical in construction to the Laboratory Model with the exception that having more than twice the knife length, machine provides actual capacity up to 350 pounds hourly.

### NO. ½ T.D. TYPE MODEL

Like Standard Ideal and Heavy Duty Ideal—requires but half the floor space of a Direct Connected Motor Driven Machine because motor is mounted on brackets secured to the legs, with cutter driven by Texrope Drive. This model has four revolving knives on the rotor and six bed knives which are set in the cheek pieces—three in each side—against which the cutting is done. Also available in Belt or Direct Motor Drive.



### NO. 2 MODEL

Designed to cut any size or weight material that can be fed into hopper, this versatile machine is available in three different chamber lengths: 12", 18", and 28". Illustration shows direct connected motor driven type machine.

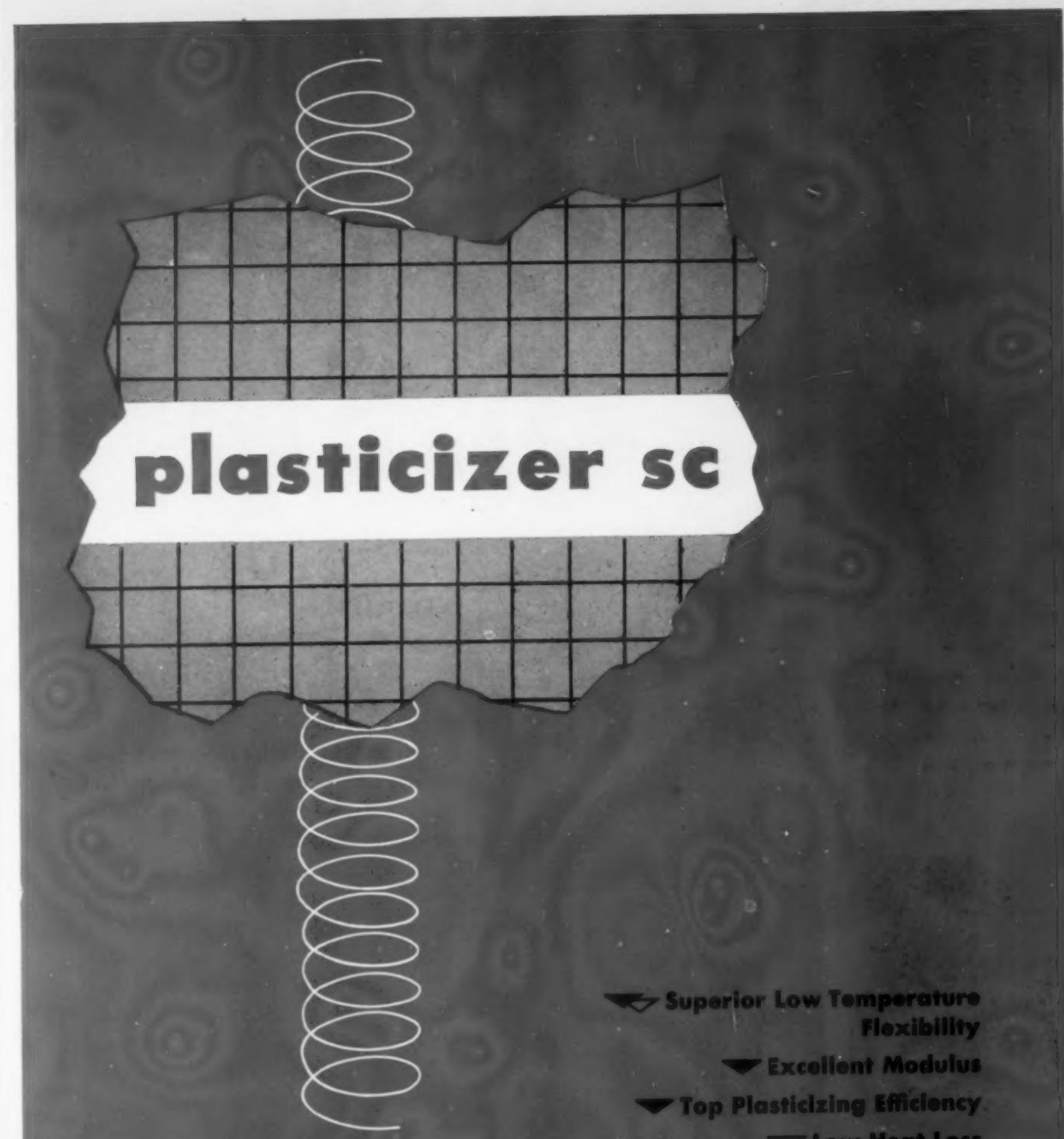
### Ball & Jewell, Manufacturers of Patent Rotary Cutters Since 1895

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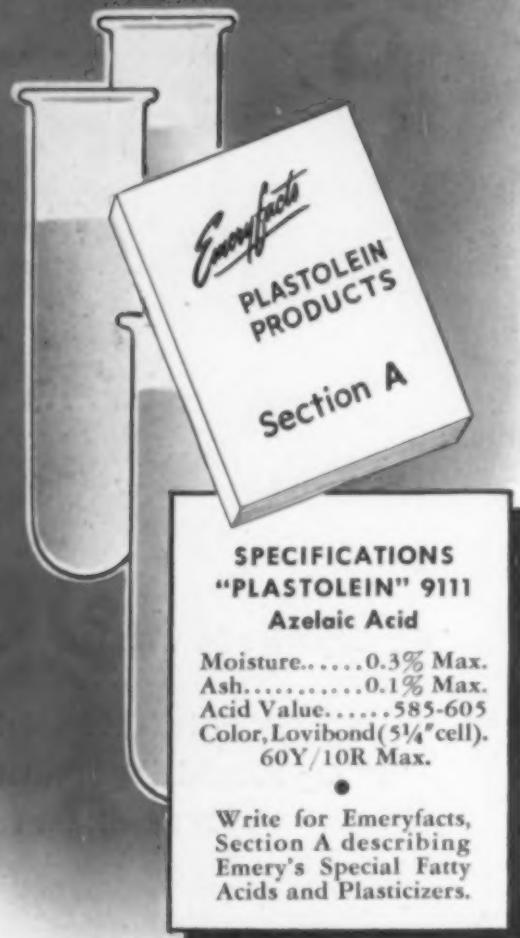
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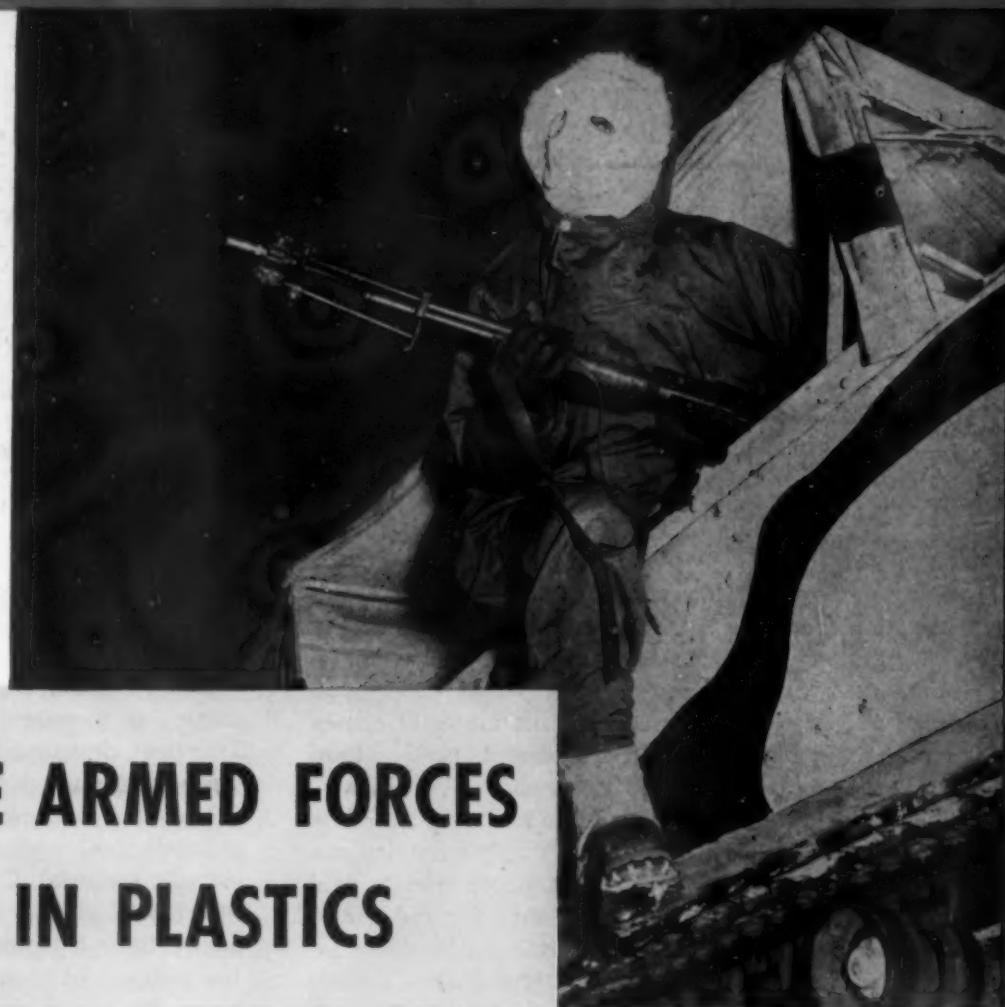


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COURTESY U. S. ARMY SIGNAL CORPS

## WHAT THE ARMED FORCES WANT IN PLASTICS

"FROM minus seventy to plus one hundred and sixty. . ." the haunting cry echoes up and down the labyrinth of corridors that twists through Washington, D. C.'s maze of research bureaus. The Armed Service's gumshoe investigators for scientific facts are hot on the scent for materials that will withstand extreme temperatures of from  $-70$  to  $160^{\circ}$  F. Indeed, aerodynamic heating from high speed planes and missiles may involve temperatures of 10 times  $160^{\circ}$  F. Past experiences at frozen Bastogne, arctic Alaska, dank and mildewed Guadalcanal, dramatically demonstrated where improvements could be made in various types of plastics materials.

Improvement is also desired in many other properties of materials. These include light weight; strength; water-, moisture-, and mildew-resistance; flame resistance; and the electrical properties that will permit signals to pass through a material without interference. But the search for substances that will withstand the greatest extremes of temperature

seems to be the scent on which there is most concentration.

There are no easily available materials having all of these properties to the degree desired. Most metals become brittle at low temperatures and corrode rapidly in the high heat and humid atmosphere of the tropics. Plastics, too, have their limitations. Consequently, the great quest is for new materials of all kinds—perhaps materials that are currently in the dream stage only.

Plastics, of course, are definitely in the running. The government's research men are not particularly concerned about the older plastics: what these materials can do has been fairly well established. The researchers want plastics that will go far beyond the performance of plastics in the past; if the old ones can be improved, that will be fine, but researchers are expecting to obtain better results from plastics now in the developmental stage or from plastics used in combination with other materials.

In the latter connection, glass is the most often



OFFICIAL U. S. NAVY PHOTO

All gun mounts on 1125 inactivated ships of the 16th Fleet have been sealed in moistureproof vinyl webbing by the Navy



OFFICIAL U. S. NAVY PHOTO

Large planes such as this Hellcat are being encased in plastic cocoons for long time storage. Smaller planes are "canned" in metal

mentioned material. An observer can scarcely resist infection from the "glass fever" that permeates the Washington atmosphere. Glass fabric—mat—batt—filament—wool. Generally impregnated or treated with one of the plastic resins, this material comes closer to meeting the stiff requirements needed than any other material currently at hand.

The use of glass with phenolic and polyester low pressure or contact resins in an experimental plane fuselage and wings, fuel cell support panels, and antenna housings needed on planes for radar and radio was reported in this magazine during the war. Details of its further use in new type planes are not available for security reasons but there is enough evidence to indicate that laminated glass is in great demand by technicians who are responsible for the development of new planes. Flying missiles and underwater weapons using various types of glass

formed by low pressure methods are suggested as large potential users of this material in the event of another war.

The optimum resin to use with glass for these particular purposes has not yet been determined. The heat developed in missiles such as the V2 is often great enough to make steel glow red. The kind of heat that glass can take is beyond the resistance of polyesters as well as any other known plastic or organic material. Consequently, there is interest in fluorinated plastics or silicones for high temperature applications. Silicone glass cloth laminates have been the subject of thorough trial and test for several years. No one is satisfied that the limit of perfection has been reached, but there has been enough progress to indicate that satisfactory laminations can be made for many applications. Electrical properties are excellent, and a heat distortion temperature of greater than 480° F. is a most desirable property.

The fluorinated plastics are newer than silicones and not too much is known about them, but they offer promising possibilities. Polytetrafluoroethylene

Saran screens withstood tropical humidity and hard wear in late war. Improved tentage offers wide field for plastics

OFFICIAL U. S. NAVY PHOTO



Many of the applications mentioned in this article were disclosed at the meeting of the Low Pressure Div. members of S.P.I. which was held in Washington, D. C., late in June. Unfortunately, it was impossible to obtain all the various speakers' papers in time to review them in this issue of MODERN PLASTICS They will be discussed in a later issue of this magazine.



COURTESY U. S. ARMY SIGNAL CORPS

A rocket launcher with 24 launching tubes and rockets used with it offer wide possibilities for plastic experimentation. A stationary mount is shown ready for action above

(Teflon) is the oldest and best known. It will withstand temperatures up to 575° F. without appreciable decomposition and has good dielectric properties. It is invaluable to the Armed Services and is already in service as a component part of vital equipment, but its practicality as a laminating material is still under test. Because of its infusibility and other properties, it is not yet easily adaptable for molding.

A new fluorine plastic, monochlorotetrafluoroethylene, is coming into the limelight. The newer material is more fusible, easier to handle, but has a lower softening point. It is not as heat resistant and is a little less durable than Teflon but is far above most plastics in these particulars and can be compression molded.

Progress in the development of fluorinated plastics is held confidential by both the Government and producers because of their present experimental

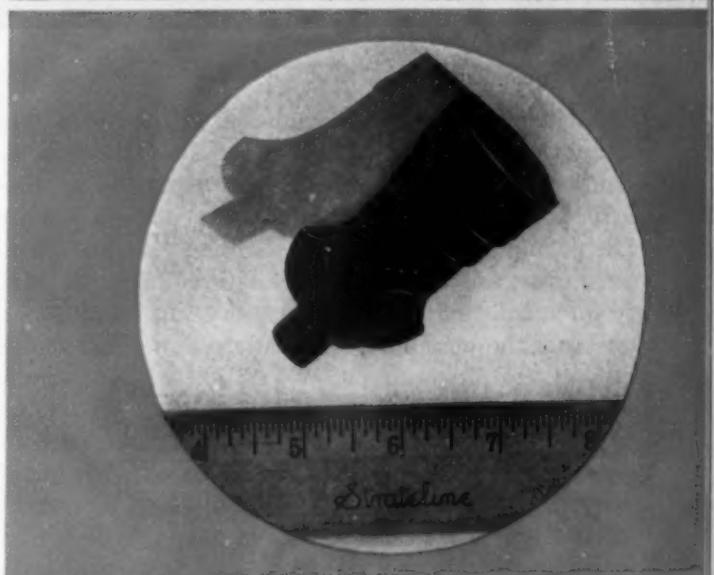
Lightweight pipe delivered to inaccessible places by air is feasible. This pipe is aluminum—could be glass or plywood

COURTESY CORPS OF ENGINEERS, DEPT. OF THE ARMY



Storm boats such as this lightweight alloy one which has just hit and traveled over the beach are well along toward development in a combination of glass fiber and polyesters

COURTESY CORPS OF ENGINEERS, DEPT. OF THE ARMY



COURTESY DEPT. OF THE ARMY

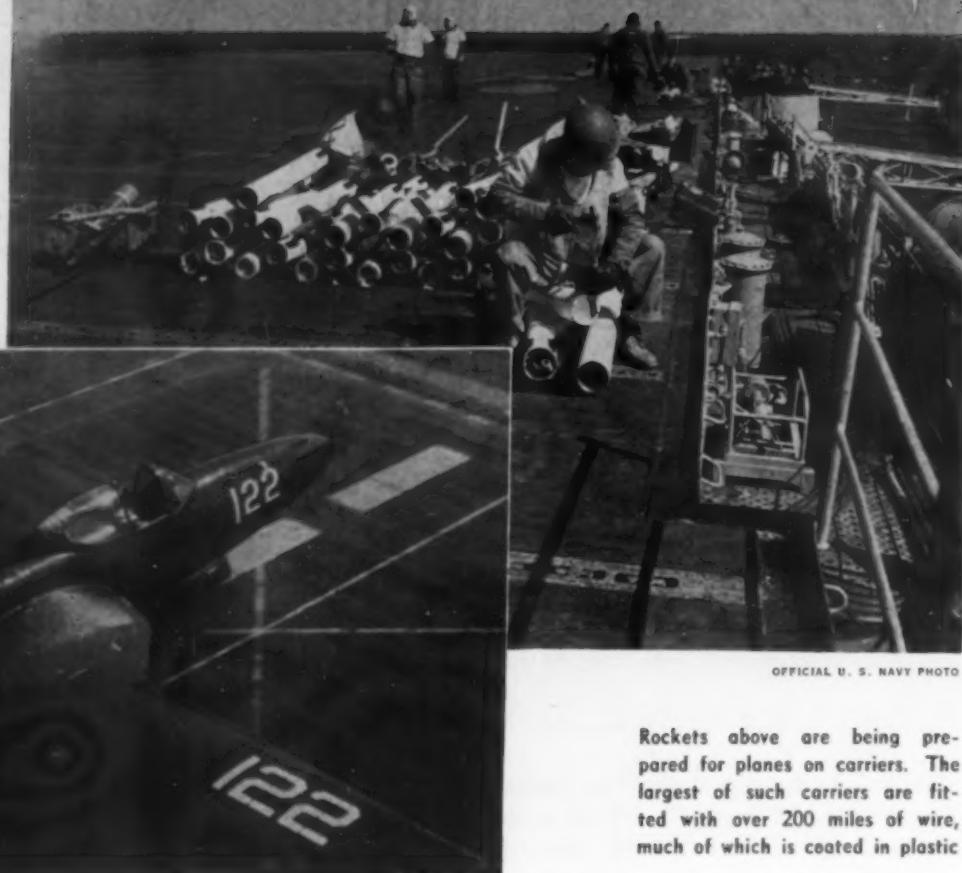
Wood-filled phenolic shower head adopted by Quartermaster dispels war-time claims that plastic was impractical

status and the usual struggle that goes on between interested parties when each is striving to be first in the field. It should be pointed out that the possible use of fluoro resins with glass is only speculative at present. However, more extended use of fluorinated plastics and silicones as materials in their own right where electrical properties, temperature extremes, durability, and chemical resistance are needed is only a matter of obtaining more knowledge of handling techniques and use performance.

Another method for improving resins to use with glass is chlorination. There is a difference of opinion

One of Navy's newest jet planes, the Phantom, on carrier. Note acrylic canopy. Many other plastic parts are needed for this type plane

OFFICIAL U. S. NAVY PHOTO



OFFICIAL U. S. NAVY PHOTO

Rockets above are being prepared for planes on carriers. The largest of such carriers are fitted with over 200 miles of wire, much of which is coated in plastic

as to just how much chlorination will improve tear strength, durability, abrasion, etc., but there is no doubt that it will improve flame resistance, a property particularly desirable for the Armed Forces. Dichlorinated styrene, for example, has high temperature resistance, low insulation losses at high frequencies, and flame resistance. In addition, it presents the possibility of plasticization. Chlorinated polystyrene in combination with glass fabric or mat can be molded from an extremely strong, lightweight material which will withstand 200° F., according to a Government researcher. Chlorinated polyethylene, as another example, would be pointed particularly towards wire coating jobs where its electrical properties and light weight are exceptionally desirable. There is a belief, however, that electrical properties would be partially sacrificed in order to obtain other qualities.

#### Why glass and resin combination

The great interest in a resin to use with glass stems primarily from the latter material's great flame resistance as well as its strength, chemical and fungi resistance, and other properties named before. Plastics generally are used with it to give stiffness, formability, density, and other properties; if the plastic doesn't have strength, mildew resistance, flame resistance, etc., it lowers the properties of the glass. Glass fabric alone will withstand over 1000° F., say researchers. None of the plastics except the silicones and fluoro resins can go over 500° F. and even these two are limited as to the length of time

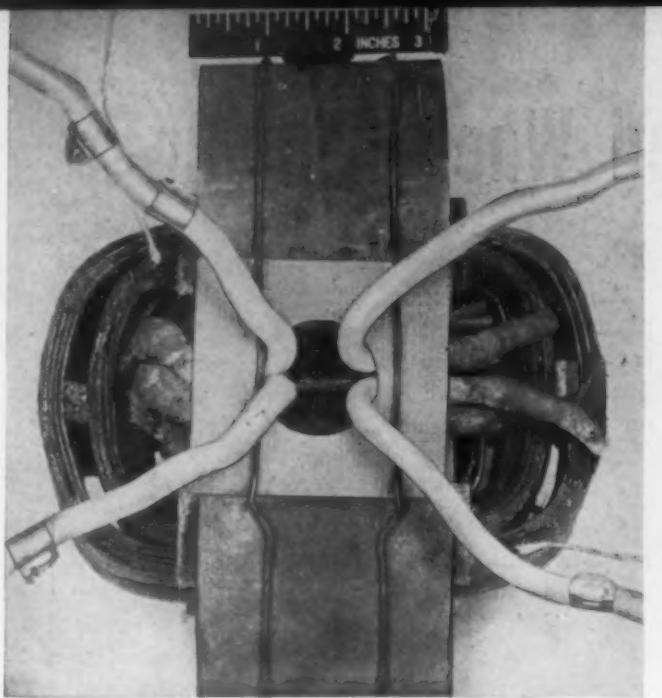
that they will withstand continuous exposure.

Aside from those resins just named, nearly all present-day plastics, in one form or another, can be used with glass, provided the heat resistant specification is not too high. Thermosetting resins with glass will go to about 375° F. before breakdown, although a new phenolic that will go to 500° F. has been tested. Melamine is widely used with glass by the Navy in various electrical installations, particularly because of its non-tracking property, but it sometimes fails at about 300° F. The limit for polyesters is around 240° F., but when no higher heat is needed, they are desirable because they offer a minimum of fabricating problems along with the customary electrical,

Plastics' ability to withstand moisture stands them in good stead during rains like this at a South Pacific base

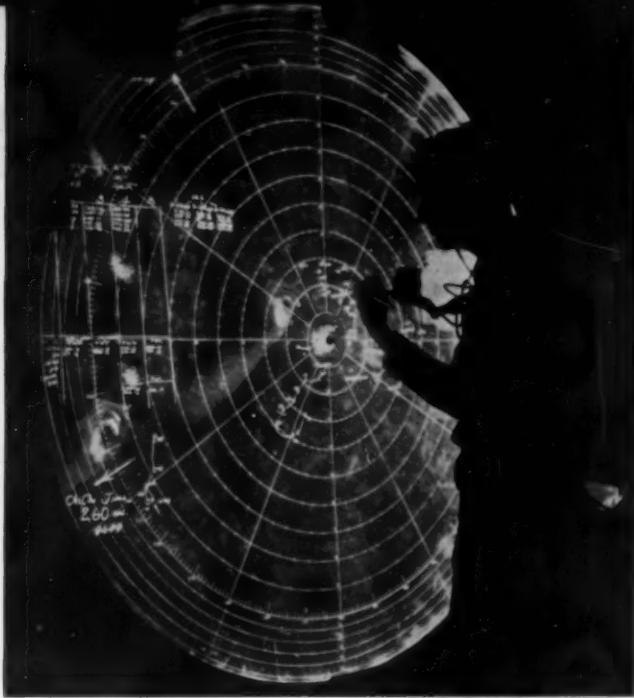
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OFFICIAL U. S. NAVY PHOTO

Silicone insulated transformer with silicone-glass spacers and panel, impregnated wire coating, and silicone-rubber-glass covered lead wires



OFFICIAL U. S. NAVY PHOTO

Information provided by radar's electronic eye is marked down on a vertical transparent plastic chart in plot room

chemical, and fungus- and mildew-resistant properties. Resorcinol, too, is receiving more than casual attention from technicians as a laminating medium either when used alone or with other low pressure phenolics to increase speed in setting and reduce pressure, or to improve the adhering surface.

Another angle of the glass situation in aviation is that of safety glass used in noses and canopies. Technicians assert that the additional heat derived from air friction in supersonic flying is great enough to affect the polyvinyl butyral sheet used between the glass laminations and to weaken the structure. No solution has yet been found. At the same time, pressurized cabins emphasize the need for shatter-proof glass. Laminated acrylic appears to offer little advantage over solid acrylic to offset the disadvantages of poor light transmission, drastically reduced strength at elevated temperatures, and production difficulties.

On the other hand, astrodomes made of acrylic specially inspected for optical properties are under consideration, and  $\frac{3}{8}$ -in. thick material is being used to replace the  $\frac{3}{16}$  to  $\frac{1}{4}$ -in. sheet formerly employed. These units are mounted on a flange in such fashion that they can be removed in five seconds to serve as an escape hatch.

The Corps of Engineers of the Army seems to have the most varied use for glass and plastics. The complete list is too long for publication here, but a few examples of what they are looking for can be given.

Portable water tanks and bags were never completely satisfactory during the war. Those originally made of treated canvas duck rotted out too quickly, and this material was in extremely short supply. When the war ended, portable tanks were being made from vinyl or synthetic coated glass cloth, but

(Please turn to page 165)

Infantrymen with mortar in Aleutians test weapons for Arctic use. Phenolic mortar fuses made history in last war

COURTESY U. S. ARMY SIGNAL CORPS



Melamine dishware is receiving long time test with possible adaption for more widespread use in the Army barracks



# Decorations Applied When Molding

**M**OLDERS have long envied the producers of decorative laminates their ability to create colorful, eye-appealing effects through the use of multi-colored printed sheets covered with a melamine or other film. This envy has led to much research aimed at adding the beauty of complicated and colorful design to the durability, cleanability, chemical-resistance and heat-resistance of thermoset moldings. One method of producing this desirable result is now being applied on a commercial scale. Molded Decorations, Inc., Newark, N. J. has a patent pending on a means of surface-decorating thermoset moldings and is already turning out a variety of molded items in which the decorative layer is made an integral part of the object right in the mold.

First introduced was a two-decker tidbit tray, composed of a 10 3/4-in. plate and a 9-in. plate, decorated with an attractive floral pattern against a black background color. Later, this same item was produced with a selection of background colors.

A well designed serving tray, octagonal in shape, was the next product to be marketed. Measuring 13 1/2 by 20 1/2 in., this tray is decorated with the same floral pattern used for the plates, and has similar background effects. More recently a completely new tray design has been added to the line. It consists of a colorful "Old New Orleans" street scene as a permanent part of the molded piece, with the background color derived from the molding material itself, rather than from the decoration.

Melamine or urea is used to mold this tray and dishes with colorful decorations applied during molding process



American Cyanamid Co.'s. Beetle and Melmac plastics have been used for all of the products thus far introduced by Molded Decorations, Inc. The process is designed for use with thermosetting resins and for parts having little or no draw.

## Membrane carries design

Complete details of the process cannot be revealed as yet. Considerable research had gone into this development before the process was ready to graduate from the laboratory to pilot plant operation. In general, the method involves the preparation of a membrane which is introduced into the mold in addition to the normal molding material. This membrane bears the design in an intermediate stage and the major problem in the development of the process was to bring all the chemicals and dyes to this intermediate stage together, so that they would be properly transformed to the final colors and chemical composition during the molding operation.

Molding temperatures and pressures are the same as commonly used for melamine and ureas. The molding cycle may be 15 to 25% longer than is used for an equivalent undecorated piece; for almost all applications, no mold changes are required.

No buffing is necessary to finish the molded pieces unless a high polish is desired. The finished molding is permanently decorated. The design cannot be peeled or washed off. No ordinary solvent will attack or destroy the colors since the decoration has sufficient penetration below the surface to protect it from any kind of rough usage.

## Possible applications numerous

Used for limited consumer application to date, the process shows promise of adaptability in many fields. Tableware, of course, should offer an important outlet since it has been evident for many years that the market for plastic plates, dishes, etc., would be vastly extended if even a simple decoration could be applied.

This field is practically limitless. Railroads, airlines, and shipping lines can now include their characteristic colors and patterns on serving dishes. A restaurant can purchase plates with its own coat of arms or crest or other exclusive design.

Packaging is another outstanding example of a field where the process will penetrate. Cosmetic manufacturers will find here a means of decorating jar tops, pancake make-up containers, trays, and many other similar items with a color pattern which would greatly stimulate sales appeal. Candy box manufacturers, also, can offer a decorated plastic container which will not only fulfill its purpose as



COLOR PLATES COURTESY AMERICAN CYANAMID CO.

Thermoset molded items decorated with new process include two-decker tidbit tray (bottom left), plates, and trays. Floral design is produced with a selection of background colors

an attractive box but will serve as a "second-use" utility container in the home. The same is true for other box manufacturers.

#### New moldings — old molds

There are innumerable plastic applications where a "change of face" is a pre-requisite from time to time. Cosmetic manufacturers, for example, find it necessary to keep up with changing fads and fancies by altering the style of jar tops frequently, which involves the production of new molds. Now it will be possible to use the same mold and to pro-

vide the decorative change with this new technique.

An important advantage of this process, and one that can save the molder thousands of dollars, is the reviving of old and obsolete molds that have been collecting dust on shelves for years. Items too numerous to mention that were once popular best-sellers and have been out of style for some time, can have their faces lifted by the simple application of a colorful design. A great deal of the money and time needed for new mold construction can thus be saved, with the further advantage of ending up with a product of superior appearance.

## MODELS BOOST



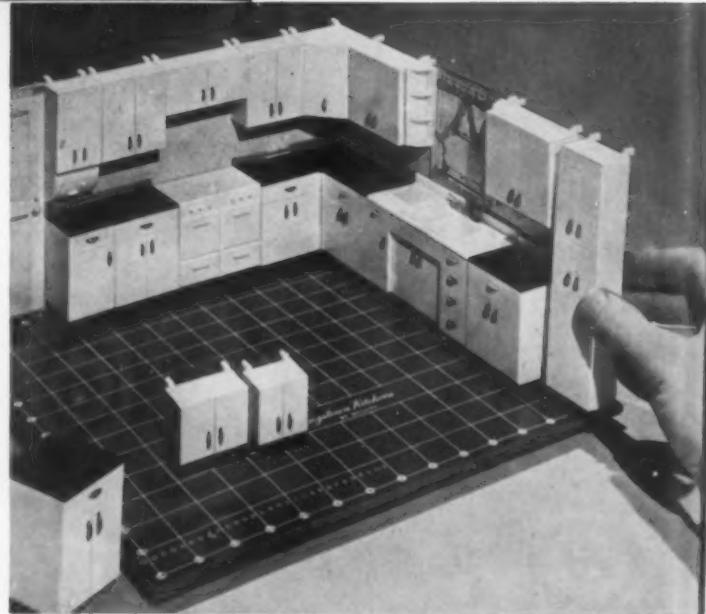
Models of Youngstown kitchen units, a scaled floor, and walls enable a salesman to show a housewife how her new kitchen will look

Five-year-old Betty spends hours arranging and rearranging the cleverly designed plastic furniture in her doll house. Brother Bob is no less enthusiastic about the miniature plastic roadsters, trucks, fire engines, and airplanes at his command. And now, capitalizing on this basic interest in miniatures which is often just as strong in grownups as in children, at least two large manufacturers of major household appliances and equipment are utilizing plastic models to assist prospective buyers in visualizing their ideal kitchen and selecting the desired equipment for it.

Mullins Manufacturing Corporation, Warren, Ohio, producer of Youngstown Kitchens, and Hotpoint, Inc., Chicago, a producer of ranges, dishwashers, refrigerators, freezers, and related appliances, are among the first organizations in this field to turn to plastic miniatures as a merchandising weapon. The Mullins units are injection molded of Tenite II, cellulose acetate butyrate, while the Hotpoint models are fabricated of acrylic sheet material. Both organizations have attained striking realism in the finished models, and both are enthusiastic over the possibilities of this type of visual selling.

### Details faithfully followed

Youngstown Kitchens' Min-A-Kitchen sets, as they are called, are designed to facilitate the work of the dealer in selling the company's line of all-steel kitchen equipment. Each plastic model is perfect to the last detail—right down to metal-color handles on doors and drawers, faucets and sprays, and back-splashes on miniature base cabinets. Packed in an attractive, easily carried leatherette



Thirty-two models are included in the Youngstown salesman's traveling case. The units are molded in white butyrate; the handles in silver

case, the set contains miniatures of each of the company's Kitchenaiders (cabinet sink unit), plus two each of all cabinets, including what-not shelves and rolling door cabinets, as well as a model stove and refrigerator. The miniature floor and adjustable walls of the set are made to scale and clearly marked, enabling the dealer to duplicate the floor plan of any kitchen and to arrange model setups which clinch sales.

Marshall Adams, advertising and sales promotion manager of the company, points out that the sets eliminate all chance for errors in measuring, planning or arranging units in the old-fashioned "pencil

# KITCHEN EQUIPMENT SALES

and paper" way. By actually working with models which are accurately scaled, Youngstown salesmen know exactly what units will go in what space and can show exactly how conveniently and attractively the completed kitchen can be arranged.

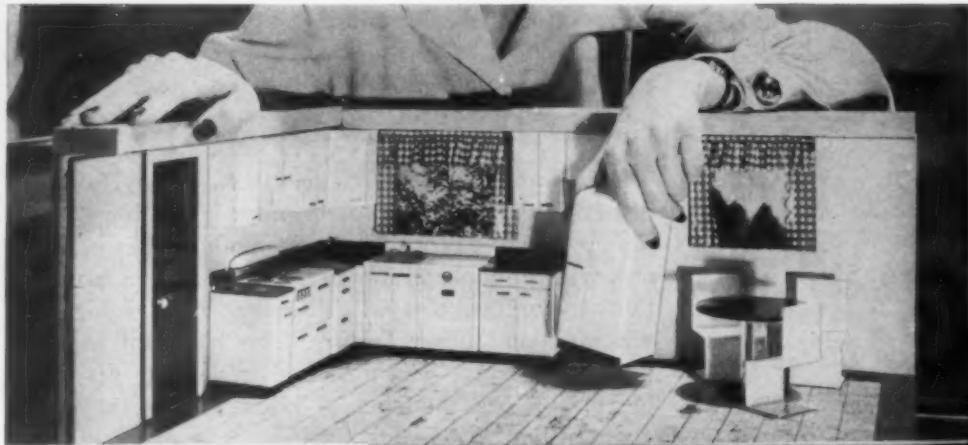
## Floor plan duplicated

In working with the Min-A-Kitchen sets, the dealer merely measures the prospect's kitchen and duplicates the exact floor plan by placing the adjustable wall at the desired point on the miniature floor, which measures 11 by 11 in. and scales  $\frac{3}{4}$  in. per foot. Then, using the plastic models, the dealer shows the prospect as many kitchen arrangements as desired. When a grouping has been decided upon which suits the buyer's taste and budget, it is a simple matter to write up the order by copying the sizes of the various cabinets directly from the figures stamped on each unit.

Molding of the miniatures is done by Merico Co., and assembly by Ideal Models Co., both in Detroit, Mich. Units which in the finished kitchen attach to the wall are molded with extensions that hook over the wall for support, and may be slid to any position desired. A lithographed metal door and two windows are included in the set to make the model kitchens more realistic. Dealers are encouraged to display a model kitchen setup in their salesrooms and for window displays. Salesmen also may carry the complete kit for home demonstrations, or lend them to prospects for use at leisure in their own homes. The plastic models are also enclosed in gift packages and given as souvenirs to customers entering the dealer's store.

## Sales barriers lowered

The merchandising impact of the Youngstown Min-a-Kitchen is apparent from the following ac-



Scale model kitchen units are used by Hotpoint, Inc., in its kitchen planning center. Housewives can arrange stove, cabinets, etc., until a satisfactory layout is found

Merits of an L-shaped Hotpoint kitchen are pointed out to two housewives. The entire unit is mounted on a turntable so it can be photographed at any angle. A customer then studies pictures at leisure and selects layout



count of a dealer's recent experience in a Louisiana community.

"A dealer had two prospects for Youngstown Kitchens that he was having difficulty closing," states Mr. Adams. "He took the miniature kit out to the first prospect and after visualizing her new kitchen to her, he not only closed the order for the kitchen, but sold one of our new Mullinaider automatic waste disposers to go along with it. This prospect was so thrilled that she sent the salesman to see a neighbor, where he repeated the process and sold another kitchen."

"In calling on his original second prospect, he found her in doubt about whether to buy a one-wall or an L-shaped kitchen. He visualized both for her and went away with the order for the one-wall kitchen and an automatic waste disposer. This seems to me to be a pretty good day's work with our Plastic Min-A-Kitchen."

#### Models photographed

Hotpoint, Inc., is utilizing its miniature plastic kitchen units in a slightly different manner, but the ultimate objective is the same—better visualization of the finished kitchen by the prospective buyer,

Here a proposed Hotpoint layout is almost ready for photographing. Note the floodlights and camera in foreground



and increased sales. The plastic models are an important part of a novel kitchen planning center recently introduced by Hotpoint at its National Home Furnishings display at the Furniture Mart, Chicago. The Hotpoint unit is arranged so that a model kitchen may be set up and photographed to give the prospective buyer a permanent visualization of the finished kitchen.

This equipment consists of a counter approximately 6 ft. long and 30 in. deep, with storage space for kitchen planning literature, miniature appliance models, and an album containing photographs of various kitchen arrangements. On one end of the counter is a small turntable upon which the miniature kitchen can be arranged. Miniature movable walls can be placed in any pattern to simulate the customer's actual kitchen. The floor is scored in squares, each representing 1 ft., to permit detailed measurements and facilitate placement of appliances, cabinets, etc.

Guided by the dealer's suggestions, the customer arranges the plastic models until a plan is attained which he or she likes best. The turntable is then adjusted to produce the most suitable perspective angle for photographing. Finally, the camera, recessed into the other end of the counter, is raised into operating position, being automatically focussed on the miniature kitchen setup. The dealer then simply turns on the two 750-watt flood lights and trips the camera shutter. The picture is given to the prospective customer and it continues to apply sales pressure long after the model units have been put away and the customer has left the store.

#### Dealers may vary display

These units will be made available to Hotpoint dealers either as a complete piece of equipment, or part by part as required. Some dealers, it is pointed out, will probably prefer to make their own installations to conform to available space, store decoration schemes, and other factors. The Hotpoint kitchen planning service was designed under the direction of Hollis Doss, manager of kitchen sales, with the cooperation of Arnolds Butler, manager of kitchen planning for Hotpoint.

The accurate scale reproductions of Hotpoint kitchen equipment used in this new program are fabricated by Regal Plastic Co., Kansas City, Mo., which produces them from white, red, and black sheets of Lucite and Plexiglas. Handles on the pieces are molded of Tenite II. Sink tops, stove tops, and refrigerators were draw-formed, while the balance of the parts were strip-heated and subsequently bent to the desired shapes.

J. S. Kivett, president of the Regal company, states that production of the miniature units entailed very close attention to details. "It was quite a production problem," he said, "to keep track of, and quickly and efficiently assemble the great number of parts required to go into these units."

Right — Ash tray and cigarette indicate size of cellulose acetate scale model of 1949 Ford. Below — "Windows" are chrome plated to look like glass. Bumpers and radiator grille are stainless steel



## Promoting the '49 FORD

WHEN the Ford Motor Co. recently unveiled its long-heralded 1949 model before a car-hungry public, it simultaneously took the wraps off one of the most powerful sales promotion programs ever centered around a plastic model of the full-sized product. Under this program, models of the 1949 Ford "Fordor," approximately 8 in. long, are being sold to Ford dealers and to department stores all over the country.

Models were first distributed as favors at a New York press luncheon held in conjunction with the world premier of the '49 Ford. For department store sales, models were released in time to tie in with Ford dealers' announcements of the 1949 cars. Stores ran newspaper ads which tied in directly with the dealer announcements, featuring such phrases as "Immediate Delivery" and "World Premier of Official Scale Model Fords."

The entire merchandising plan for the scale model Fords was developed jointly several months ago by West H. Gallogly of Aluminum Model Toys, Inc., Detroit, and F. J. McGinnis, director of sales promotion for Ford. In order to preserve the secrecy which surrounded the new Ford announcement, the Ford Motor Co. obtained a \$10,000 security bond from Gallogly before furnishing him with a plaster model.

The toy cars, molded of Tenite cellulose acetate by United Plastic Industries, Vassar, Mich., are produced in all 10 colors in which the new Fords are offered, and in fire-engine red. Faithfully reproducing the flowing lines of the original, the Tenite bodies are equipped with stainless steel bumpers and grille. The cars are produced in a two-cavity cam



Fence carries current to electric powered version of Ford model. Motorless and spring-wind versions are also made

actuated mold made by Beauchamp Plastic Molds, Detroit.

The promotional value of the models is greatly enhanced by the fact that they are being made available either as "coasters" (without motor), with a spring wind up motor, or with an electric motor. The latter type of model is sold through Ford dealers only and comes equipped with 25 ft. of fencing which carries the current to the model in the same manner as does the track of an electric train.



COLOR PLATES COURTESY BAKELITE CORP.

Vinyl bedspreads stay fresh for months without washing, and never need to be pressed. The all-over designs possible with hand painting, like the floral design shown, may make vinyl more acceptable in the bedroom. Note vinyl curtains

## Hand Painting on Vinyl

New method of decorating vinyl sheet allows all-over patterns, greater originality of design, and wider variety of color

VINYL film, decorated by roller printing or silk screening, has already won a place in the home as a material for shower curtains, draperies, bed-spreads, and table covers. Even greater consumer acceptance of the material in such applications will probably result from the recent introduction of a method of hand painting on vinyl film.

The main advantage of hand painting is that it makes possible greater originality of design and allows a freer combination of colors. In contrast with roller printing, which can be used only for continuous patterns, hand painted vinyl products can have all-over designs such as the scenic murals illustrated on the opposite page. Another advantage is the sales value of the words "hand painted."

The problem of developing paints which could be used on vinyl film was complicated by the fact that the surface of the film is totally non-absorbing. Thus

the paint remains on the surface of vinyl instead of penetrating as paint does on canvas.

### Vinyl paint used

The solution to the problem was the development of a special paint in which the vehicle itself is vinyl. Solvents in the paint soften the surface and allow the vinyl vehicle containing the pigments to combine with the film. Thus the design actually becomes a part of the film.

Among the companies now using this method of decorating Vinylite film are Darlo, San Francisco, Calif., and Para Mfg. Co., New York, N. Y. The shower curtain with the floral design, the window curtains, and the bedspreads in the accompanying illustrations are made by Darlo. The shower curtains with the murals depicting foreign scenes are from the Palette series of curtains made by Para.



Window curtains made of vinyl can be cleaned with a damp cloth, always look crisp, and will not shrink if rain hits them



Graceful, sweeping lines of the floral design on this shower curtain show how hand painting gives designer greater scope

Shower curtain with peaceful oriental scene hand painted on it is one of a series of murals featuring foreign scenes

This well executed scenic mural seems to give the curtain a three-dimensional effect unobtainable with continuous pattern





Aerial view of newly completed plant for the production of silicone materials at Waterford, N.Y. Plant consists of six buildings and a chemical tank farm located on a 15-acre plot. It has been in partial operation for a year

## Silicone Production Steps Up

Newly-completed plant is producing silicone materials which are finding wide variety of applications

THE unique properties of the silicones have led to their use in a wide variety of applications but until recently, the supply has been limited. The supply situation has been changed by the recent completion of a multi-million dollar plant for the manufacture of silicone materials by the Chemical Department of the General Electric Co.

The new plant consists of six buildings and a chemical tank farm located on a 15-acre plot at Waterford, N.Y. It has been in partial operation for about a year, but it is now in full production on silicone rubber, oils, greases, resins, and water-repellents.

The outstanding property of silicone materials is their ability to withstand a wide range of temperatures. Their operating range is between -70 and 520° F. This makes them particularly adaptable to certain types of equipment used by the armed forces, because such equipment may be exposed to arctic or tropical climates.

### Golf ball centers

The major output of General Electric's silicones is in the form of rubber, oils, and the famous "bouncing putty." The bouncing putty is used extensively as the centers of U.S. Royal golf balls manufactured by the U.S. Rubber Co., New York, N.Y.

Another consumer application for the bouncing putty is in devices to even up the legs of tables, chairs, pianos, and other furniture. The putty is



Bouncing putty (foreground), one form of silicone material, is used to make the golf ball core shown in girl's hand

put in a caster-like piston at the foot of a table leg, and can lengthen the leg as much as 3/16 inches. It acts automatically, by hydraulic pressure. The leveling device, called Levelmatic, is manufactured by Blake Industries, Detroit, Mich.

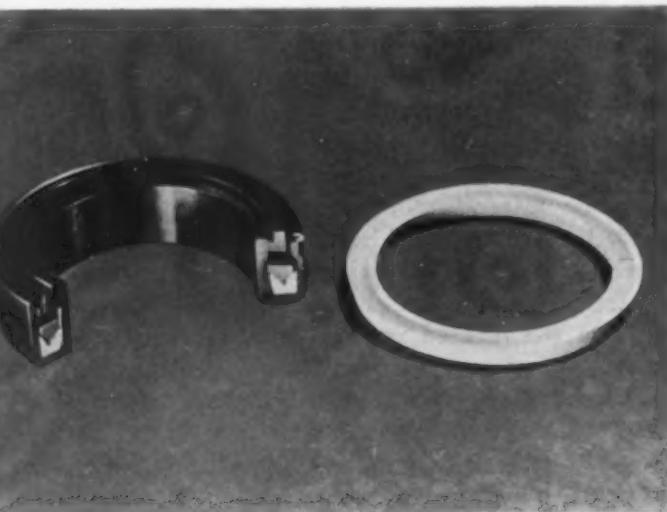
### Mold release agent

Silicone oil has proved itself as a mold release agent. It was first used for this purpose in the molds used for the manufacture of automobile tires, and its use was later extended to the molding of other rubber products, plastic parts, and mica. The latest application of silicone oil in this general field is in the production of aluminum and zinc die-castings.

The oil facilitates production and helps provide a smooth surface on the finished parts. Because of its relatively low surface tension, the silicone oil wets the mold readily and penetrates small cavities. It can be applied by brushing, spraying, or wiping, and will withstand temperatures during molding of up to 600° F. The fact that it will not decompose under high heat reduces the frequency of mold cleaning and makes it possible to maintain closer tolerances.

Silicone oil is also used as an anti-foaming agent in liquid systems, as a hydraulic fluid, as a damping fluid, and as a liquid for constant temperature baths. In addition to its wide temperature range, it has the advantage of being practically non-flammable. In damping devices, its constant temperature viscosity permits shock to be absorbed evenly.

Silicone oil is available in three grades with varying viscosities. For low temperature service, grade 9981 LT is available in viscosities of four and 35 centistokes. Grade 9981 LTNV is available in viscosities of 20, 40, and 70 centistokes. This grade is recommended for aircraft hydraulic fluids, manom-



Packing for oil seal is made of silicone rubber, gives good gasketing performance at temperatures up to 400° F.

eter liquids, cooling baths, and constant temperature baths. Grade 9996 is non-volatile and relatively non-flammable, and is recommended for high temperature service. It is available in viscosities of 100, 300, 500, and 1000 centistokes. Higher viscosities are available in this grade when required for special applications.

#### Silicone rubber gaskets

Primary use of silicone rubber today is for manufacturing gaskets for industrial products such as capacitors, jet and gas turbine engines, lighting fixtures, high vacuum systems, and baking ovens. The silicone provides excellent resistance to alcohol,

phenol, and other solvents, and is particularly effective because it contains no plasticizer.

The Sealol oil seal shown on this page gives good gasketing performance at temperatures up to 400° F., an increase of 200° above previously allowable temperatures. The silicone rubber used for the "V" packing in the oil seal swells on contact with hot oil. But the swelling does not result in binding around a shaft because the surface temperature of the silicone rubber never reaches the softening point of the material.

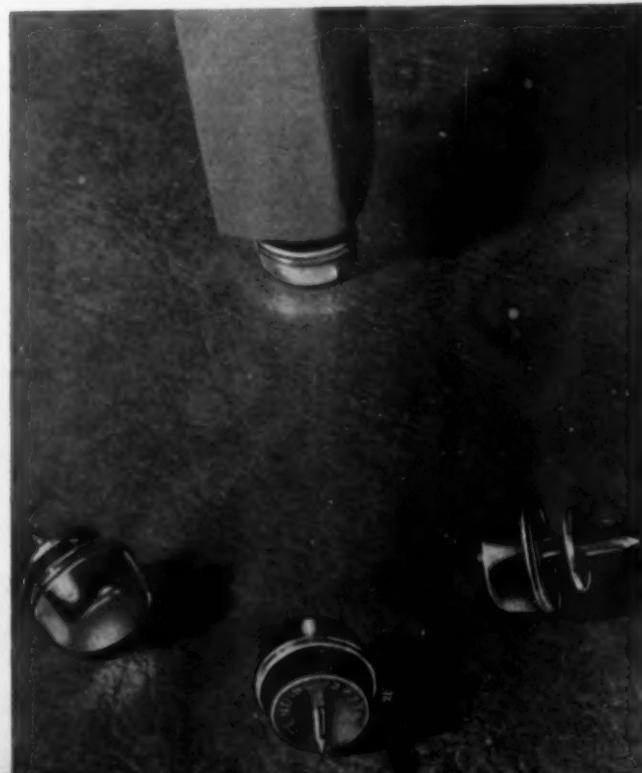
In jet engines, molded silicone rubber O-rings 15 in. in diameter seal two main parts of the engine against air and oil vapors. The gaskets are continuously subjected to temperatures between 350 and 400° F., and remain soft and resilient, without swelling or deterioration.

Another application for silicone rubber results from the fact that the material will not stick to metals. It is used for valve seats in relief valves for domestic hot water tanks. The rubber gaskets previously used often stuck to the metal collar during hot dry storage or at high operating temperatures.

#### New adhesive

When necessary, silicone rubber can be bonded to metals, ceramics, or to itself with a new adhesive developed by General Electric. The adhesive has properties similar to silicone rubber itself, and can also be used to bond glass to glass, glass to metals, or metals to metals. Because of its heat resistance, this adhesive is now used to secure rubber door gaskets directly to oven doors, thus eliminating the need for clamps or bolts.

Bouncing putty is used in device which automatically evens up legs of tables, chairs, or pianos by hydraulic pressure





The three polystyrene parts of Zenith's Zenette—cabinet, cover, and front plate—are at far left. Handle is butyrate extruded over steel ribbons



The diminutive four-tube Zenette portable measures 7½ in. wide, 5½ in. high, and 4 in. deep

## PORTABLES use More Plastics

A thermoplastic sheet with a fabric core forms cabinet of this Motorola radio. Polystyrene handle houses the dial

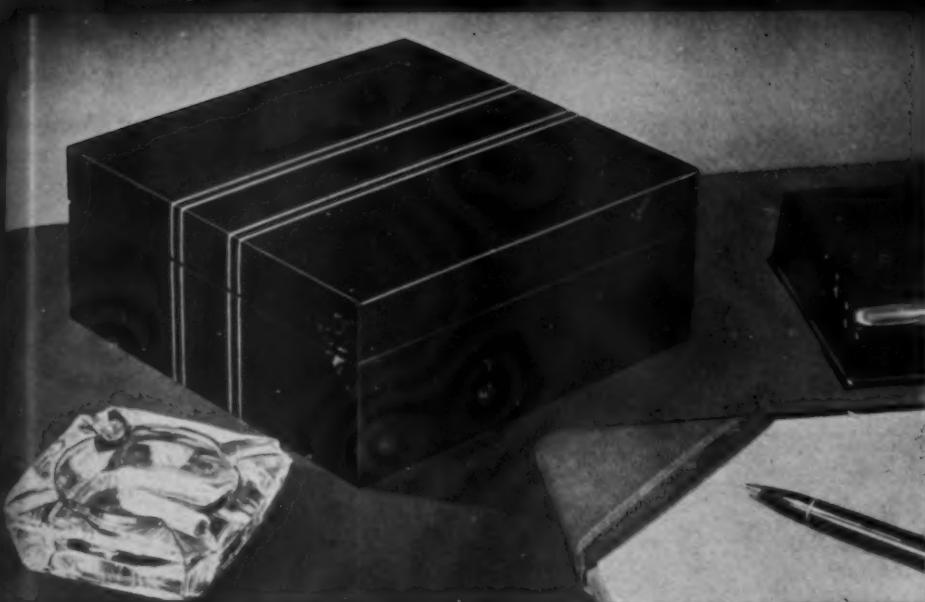
WITH portable radio receivers coming into ever increasing demand, not only for use outdoors but also as "auxiliaries" in the home, the use of plastic housing for these sets is likewise increasing. In such applications, plastics offer advantages of light weight, flexibility of design, and low cost.

Of all the new portables offered this year, a model made by Zenith Radio Corp., Chicago, Ill., is one of the most interesting because of its tiny cabinet, molded of Lustrex heat-resistant polystyrene. Lustrex was specified here because the extremely small size of the cabinet brings the heat of the tubes close to the molded parts. The material affords a measure of protection against heat buildup; also, 10 ventilation slots are provided in the top of the cabinet and additional vents in the bottom plate. Measuring 5½ in. high, 4 in. deep, and 7¾ in. wide, this four-tube portable is known as the Zenette.

The fully enclosed cabinet is injection molded in

Another Motorola portable uses red and beige polystyrene in the two-part housing, grille, and knobs. Handle is of vinyl covered steel





Cast phenolic is used for the cabinet of this Emerson Memento desk model. The face of the radio, knobs, and inside switch button are of polystyrene



The lid of the Memento has a removable acetate frame for insertion of picture

burgundy, black, and ivory polystyrene. The Santay Corp., Chicago, Ill., performs the molding and finishing operations on the cabinet parts, which include the cabinet proper; the hinged cover, which is raised to upright position when the set is to be operated; and the loop cover.

An average wall section of approximately  $\frac{1}{8}$  in. is maintained on the major cabinet component, with lighter sections on the cover and loop cover. Substantial cored bosses on the cabinet and the cover facilitate assembly with self-tapping screw.

The handle is of the Zenith-developed "Flexogrip" style, incorporating steel ribbons within a coiled Tenite II extruded section.

#### Compression molded laminate

The first radio to reach the market with a case drawn from a compression molded laminate composed of a transparent thermoplastic material and

a colored fabric core is the new Model 68L11 portable produced by Motorola, Inc., Chicago, Ill. The case, which is molded in two halves, is made by Woodall Industries, Inc., Detroit, Mich. It is assembled by means of an encircling decorative strip of stainless steel or aluminum. The dial for this model is incorporated in the handle, with the calibrations visible through a clear polystyrene channel.

#### Two materials used

The cabinet of another Motorola portable, Model 58L11, is molded by the Cruver Mfg. Co., Chicago, Ill. The two-part case is molded of Lustrex in a combination die which makes the front and back of the cabinet. The grill and knobs are molded of Lustron polystyrene in another combination die which produces two grills and two sets of knobs. There is a removable insert in the die for the left hand control section of the front cover, by means

The leather textured polystyrene housing on this G. E. portable enhances its appearance and blends with the simulated leather handle

A thermosetting plastic — urea formaldehyde — is used to mold the housing of this Fada portable radio. Plastic parts are an ivory color



of which the words "Batt., Off, AC, DC" can be molded in if the set is to be sold as a combination battery and AC-DC unit. For those sets which are for AC-DC only, these markings are left off.

The handle on this set, fabricated by Beewar Plastics, Addison, Ill., consists of a flat piece of spring steel covered with vinyl tubing over which braided vinyl-covered yarn is placed, the yarn being supplied by Braided Specialties, New York, N. Y.

#### Total weight 11 pounds

Production of a new light weight plastics portable radio cabinet designed to house the GE Model 150 has been announced by the General Electric Co's. Plastic Div., Pittsfield, Mass. The cabinet is injection molded of polystyrene and the set, complete with batteries, weighs only 11 pounds. Thumb wheel controls are at either end of the dial. Both front and back panels have a leather-textured surface.

#### Hinged cover

The new AC-DC battery portable being produced by the Fada Radio & Electric Co., Inc., Belleville, N. J., has a cabinet which is injection molded of Plaskon urea by the Victory Plastics Co., Hudson, Mass. The ivory colored cabinet has a Vinylite carrying handle in the same color. A hinged cover protects the controls when the radio is not in use.

#### Three-part cabinet

A two-color cabinet is a feature of the new portable manufactured by the DeWald Radio Mfg. Corp., Long Island City, N. Y. The cabinet, which is injection molded of Styron polystyrene is made in three parts by the Tech-Art Plastics Co., Long Island City, N. Y. The back and the grill are molded of one color in a combination die, while the housing

is molded of a second color in a single cavity die. The control knobs are also molded of polystyrene and a vinyl carrying handle is provided.

The grill is glued to the housing with a toluol base bonding agent. The gating was so designed as to lend additional support and bonding surface for the assembly operation. The back of the radio is hinged to the housing and is held closed by lugs which engage with spring clips. Finger slots are provided in order to open the back.

#### Desk model uses batteries only

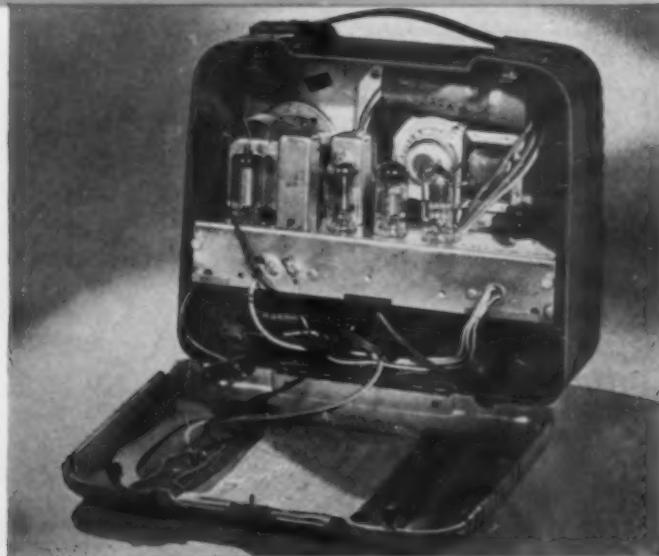
A personal portable that operates on batteries only and is suitable for home or office use is the Memento, recently announced by the Emerson Radio & Phonograph Corp., New York, N. Y. The case of cast phenolic is produced by the Catalin Corp. of America, New York, N. Y. One of the features of this radio is the picture frame within the cover, fabricated of cellulose acetate by the T. D. Shea Co., Chicago, Ill. The buffing and finishing on the case is done by the Plastic Turning Co., Leominster, Mass. Catalin was chosen because the set was conceived as a luxury model for executives, and it was felt that Catalin would give the desired rich appearance.

The face of the radio, the knobs, the switch button, and the small pin on the frame are all molded of polystyrene by the Gemloid Corp., Elmhurst, L. I., N. Y.

Those portables which have been described here were selected from the dozens of models on the market because of various distinctive features. Space limitations make it impossible to describe all the portables which make use of plastics. However, this representative group clearly illustrates the trend toward more plastics in portable radios.

Housing of this DeWald radio is of polystyrene; the grille and back are of some material, but in a contrasting color

The polystyrene back of this same DeWald portable is hinged so that batteries and tubes of the set are easily accessible





Polyvinyl chloride resin film is die cut to form liners for men's collars. It is fused to cloth under steam pressure

## Plastic Stiffens Men's Collars

**A** COLLAR liner which, it is claimed will prevent shrinkage, reduce wrinkling to a minimum, and add a new chapter to the technique for manufacturing men's shirts has just been placed on the market. The official name of the new product is the Pre-fuse collar lining, manufactured by a subsidiary of the J. P. Frank and Co., Inc., New York, N. Y. Patent has been applied for.

The liner is die cut to the shape of a collar from calendered plastic film manufactured from a special formulation of Geon polyvinyl chloride resin. In appearance it resembles a piece of cloth more than it does plastic film. The liner is placed between the two layers of cloth of a shirt collar and fused to them under steam pressure of from 65 to 75 lb. and 75 to 85 p.s.i. plate pressure. The time cycle is from 10 to 20 sec., depending on the type of press. After the film and two layers of cloth are fused together, they become an integral unit. There is no possible way for the cloth to shrink; the film holds it to the original dimensions of the collar.

The manufacturer points out that this liner is not a substitute for any other type but offers a brand new method for processing collars on men's shirts. Practically all shirt collars are made with two layers of cloth, and many of them have a fused liner between to give style, neatness, and a measure of

firmness. Heretofore there have been two methods of producing these "semi-stiff" collars. In the process called fuse coating, the liner is ordinary print cloth or cotton sheeting which is coated or spread with cellulose acetate, vinyl, or other material, and fused to the two outside cloth layers with heat.

The other process involves use of a fabric liner woven of two thirds cotton and one third acetate yarns. When bonding to the collar, an alcohol solvent is used. The steam and heat used in the bonding process, together with the solvent, dissolve the acetate to form the bond.

### Lower cost

One yard of the new collar liner will serve for two dozen shirts and, according to J. P. Frank, will save the manufacturer from 10¢ to 15¢ per dozen shirts.

The plastic inner liner will make a collar appear no thicker than will any other liner and will assertedly give the collar a freshly ironed appearance for a longer period of time. Wrinkling will be minimized since this is generally caused by the different rates of shrinkage and stretch between the two layers of shirt fabric and the inner liner. Under such circumstances the bond between liner and collar walls may weaken. With the new plastic liner, the collar becomes more firm with use because there is no bonding agent to wash out, and the specially compounded plastic has a tendency to stiffen as it ages. Shirt collars fitted with the Pre-fuse collar lining, tested by a professional testing laboratory, have successfully withstood 35 washings without shrinkage.

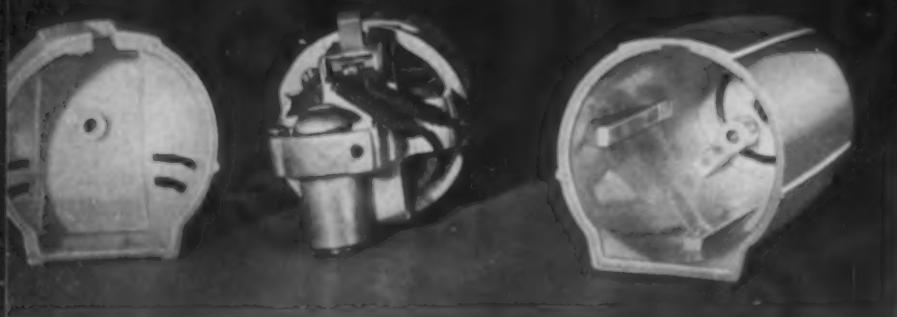
Greatest difficulty encountered during the processing was overcoming a tendency of the plastic to flow, leaving a rough edge on the base of a collar. Flow was eliminated by special compounding, and the edge of the collar is as smooth as, or even smoother than, the flat surface.

J. P. Frank Co. officials estimate that they will start using 150,000 lb. of resin a month on this job immediately and that it will boom to a figure far above that amount for collar linings alone because of their product's efficiency and low cost. Current price is reported to be half that of other high grade linings.

Many other uses for the lining material are in the offing. The pleat down the front of shirts where the buttons are sewed on, and cuffs also, are definite possibilities. At present, reinforced cuffs use a much less costly liner than that used in collars. Belts or any cloth lamination where two pieces have to be used as one are other possible applications. In some cases a less expensive cloth in two layers may be used to obtain the same effect as a heavy cloth in one layer. For laminating or bonding fabrics, a new idea has been born and is waiting only for the imagination of processors on how to apply it before another lusty market is an accomplished fact.

# FLAME RESISTANCE IN ACETATE

by DR. FRANK D'ALELIO



Above—Electric mixer has motor housing injection molded of flame-resistant cellulose acetate. Left—Close-up view of front part of cellulose acetate housing (at left), electric motor (center), and back of housing

THE use of plastics for the manufacture of enclosures for small electrical appliances is not new. Thermosetting materials have long been employed in some applications. They offer many advantages over metal housings: light weight, good electrical properties, low heat conductivity, plus the economy in manufacture and assembly provided by a material that requires a minimum of finishing and has a permanent, colorful, long-wearing surface. There has been a continued need, however, for a plastic material that would combine these desirable qualities with the inherent toughness and resistance to impact so necessary to products exposed to harsh service conditions. For this reason the development of a flame-resistant cellulose acetate is one which the electrical industry—among others—has been watching with great interest and anticipation.

At this time there can be no question of the availability of a satisfactory flame-resistant cellulose acetate. Several applications employing flame-resistant formulations of acetate have successfully met Underwriters' Laboratories' requirements and have been granted approval. These products, which include electric mixer and shaver housings, blanket

switches, and vacuum cleaner parts, are now in production and in use. Flame-resistant acetate is no longer a dream; it is a proved reality.

There were several difficult problems to be overcome in the development of a material suitable for such needs. Both heat and flame resistance were required, and normal acetyl<sup>1</sup> formulations of cellulose acetate did not provide a sufficient degree of dimensional stability for moldings that required critical tolerances both for speedy and accurate assembly and for satisfactory mechanical performance. Few of the cellulosic materials are either flame retardant or self-extinguishing. The problem was therefore two-fold: to obtain a formulation with increased form retention plus heat and flame resistance to meet Underwriters Laboratories' requirements.

Flame-resistant acetate is, in a sense, an outgrowth of the development of high acetyl formulations of acetate—that is, hard flow materials of sufficient dimensional stability to meet the mechanical re-

<sup>1</sup> "Normal acetyl" is the term generally used to describe the original or pre-war grade of cellulose acetate. "High acetyl" cellulose acetate (developed by Hercules Powder Co. during World War II) is a new type of acetate in which greater amounts of acetic acid have been chemically bonded into the material. This higher acetic acid ratio (high acetyl content) provides the resultant cellulose acetate plastic with increased resistance to heat and moisture pickup. Flame-resistant formulations based on high acetyl acetate produce a thermoplastic material combining better resistance to heat and flame.

quirements of precision molded housings such as the electrical industry requires. It is the improved dimensional stability factor, coupled with the introduction into the formulation of flame-depressant, non-volatile type plasticizers which provides a material suitable for small motor enclosures and other applications in the electrical appliance field.

It is interesting to note that a degree of flame resistance can be obtained in formulations based on either normal acetyl or high acetyl acetate flake by the use of flame retarding plasticizers, but a far superior degree of flame resistance is provided in the stiffer grades of materials. The reason for this is that flame resistance resides to some extent in the cellulose acetate flake itself. Even when flame-resistant plasticizers are chosen to provide relatively lower combustibility, they are still more flammable than the cellulose acetate. Hence the hard flow materials, which are harder or stiffer because of their lower plasticizer content, are also more flame resistant and more quickly self-extinguishing than softer flow formulations incorporating the same type of plasticizer. It is recommended that a material not going below H2 in hardness be used in flame-resistant formulations. Whenever practicable, even higher flow materials should be considered. Higher flow materials, however, involve increased cylinder temperatures and a more critical molding operation, and this must be borne in mind by the product engineer when a material selection is being made.

Flame-resistant acetate is *not* flameproof. When exposed to sufficiently high temperatures, distortion and softening will result. When a flame is applied for a prolonged interval, the material will ignite, but is self-extinguishing. In flammability tests conducted by Underwriters' Laboratories on housings for A. C. Gilbert's Whirlbeater mixer—molded with a Koppers flame-resistant formulation—three enclosures without motors were exposed to the flame of a bunsen burner for 30 seconds, then allowed to burn until self-extinguished. In each case the material burned slowly for a short interval (25 seconds was the longest interval measured), and then extinguished itself. It is this self-extinguishing factor of the flame-resistant formulations, together with the resistance to distortion provided by the improved dimensional stability of a high acetyl material, which qualified the housing for UL approval.

The comments of Underwriters' Laboratories on the Whirlbeater tests offer a good description of what can be expected of today's flame-resistant acetate materials:

"In considering the use of thermoplastic materials for the enclosure of this electric mixer, it was necessary to give consideration to the possible normal and abnormal conditions which might affect the material. It was considered desirable to have a material of high temperature characteristics which would resist softening and distortion should the mixer be placed on a hot surface such as a steam radiator.

"The mixer should resist mechanical abuse such as would obtain from dropping the mixer from a table top to the floor. Further, the material should be self-extinguishing and should not soften or disintegrate sufficiently to expose any live or current carrying parts when operated under the most severe conditions likely to be encountered in service.

"The temperature test, conducted at 212° F., demonstrates that the material is sufficiently heat resistant to resist softening or distortion which might occur under somewhat abnormal conditions of use such as might occur if the mixer were placed on a steam-heated radiator. (Underwriters placed six samples of the mixer in an oven at 212° F. for 7 hours. At the end of this period there was no evidence of distortion.)

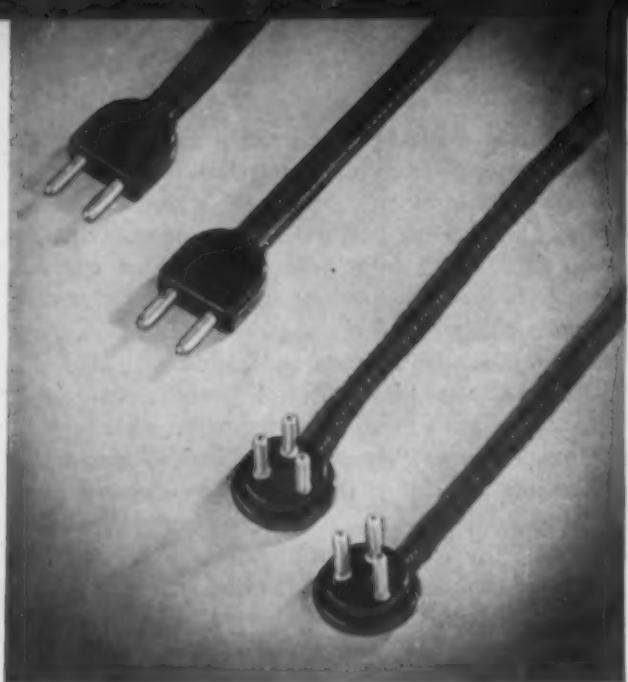
"The enclosure offers adequate resistance to ordinary abuse which might occur in actual use. The slight cracking of the enclosures is not considered objectionable considering that there was no exposure of live parts which would present a shock hazard even though the mixer was dropped from a height of three feet on a hardwood surface.

"The abnormal test which consisted of stalling the rotor is a condition not liable to occur in service. The slight deformation of the enclosure which was caused by the excessive heat generated by the



*The Author: Dr. G. F. D'Alelio, assistant director of research for Koppers Co., Inc., has achieved wide renown in the field of chemistry since he was graduated from Boston College in 1931. He holds 248 patents, mostly in the field of high polymers or plastics, and at the present time has nearly 100 patent applications pending. He also is the author of the book, "Experimental Plastics and Synthetic Resins," published in 1944 and now in its third edition.*

Dr. D'Alelio received an individual citation from the Bureau of Naval Ordnance in recognition of his war research and development work. During the war, he was an industrial consultant to the referee board of the Office of Production Research and Development; on the advisory panel to the Committee on Quartermaster Problems of the National Research Council; a consultant to the Bureau of Naval Ordnance; and a consultant on the Manhattan (atomic bomb) Project at Columbia University.



Left — Electrical applications of flame-resistant cellulose acetate already approved by Underwriters' Laboratories include a two-pronged plug for home movie projector lamps and a three-pronged plug for a Dictaphone amplifier. Right — Bubbling Christmas tree light has fluted collar molded of cellulose acetate. Tube is made of glass and socket is molded of phenolic

stalling of the rotor is not considered a hazardous condition in view of the results, wherein there was no expulsion of flame or molten metal, nor ignition of the thermoplastic material or combustible surface on which the mixer was placed during the test.

"The flammability test was conducted on the complete enclosure rather than on special test samples as specified by ASTM, considering that the test if conducted on special laboratory test specimens would not be truly representative of actual conditions as might exist should the material be subjected to a flame under some abnormal condition. The results of the test show that the material can be ignited but that once ignited the flame is quickly extinguished by flame retardants added to the thermoplastic compounds. The material can be classed as self-extinguishing on the basis of the test results.

"Thermoplastic materials are not considered suitable for the mounting of current carrying parts, or similar purposes, due to the possibility of displacement through distortion of the material. The thermoplastic enclosure of this device does not serve to support or mount current carrying parts of the device and serves only to enclose the motor and other functional parts of the device. The acceptance of thermoplastic material for the enclosure of this small motor-operated appliance does not indicate the general acceptance of this material for enclosing other electrical equipment."

This last paragraph in the Underwriters' report is all important. *Application approval is not based solely on the material formulation used, but on the actual product itself in its finished form.* Therefore, the mere use of a flame-resistant material does not guarantee a product that will automatically be granted Underwriters' Laboratories' approval for heat and flame resistance. However, with the growing fund of application data now available, the competent designer can plan for the use of a flame-

resistant acetate in a wide variety of products, with good reason to believe that UL approval can be obtained.

The techniques involved in molding the flame-resistant materials are the same as those required when any of the harder flow acetates are used. Laboratory and field experience has shown that improved results are often obtained by the use of relatively larger gates and correspondingly higher mold temperatures than those customary when normal acetyl compounds are employed. In most cases parts can be best produced in the type of mold and under the same molding conditions as those required for molding acrylic. Machine temperatures will range from 400 to 450° F., with the actual temperature of the plastic material ranging from 390 to 410° F. (which is comparable to temperatures used in molding polystyrene).

The compounding of flame-resistant formulations by the materials producer requires critical controls to maintain a uniformity that will meet the rigid requirements set down by Underwriters' Laboratories. An exacting balance of the flame depressant modifiers in the plasticizer must be maintained to secure the optimum in finish and strength throughout the service life of the molded part while at the same time providing a good degree of moldability. Only conscientious effort on the part of the molder to maintain heat and pressure tolerances can carry this uniformity into the finished product.

From a standpoint of both appearance and performance, the new flame-resistant acetates promise to play a great part in improving the products of tomorrow. Rich stable color, warm to touch, sleek streamlined styling, and light weight all mean a product of increased eye and sales appeal. Good finish, improved surface hardness, and the unrivaled impact strength of the celluloses mean a product that will stand up in use. And a high-speed injection molding cycle means lower production costs.

# Windows Glide on Plastic Track

UNUSUALLY long molded pieces are used for the sill tracks of gliding windows manufactured by the Anderson Corp., Bayport, Minn. The sill tracks are molded in three sizes by Keyes Fibre Co., Waterville, Me., using a phenolic resin and a long fiber wood pulp filler. The largest size measures 64 1/16 by 3 5/32 by 3/8 inches. The others are 52 1/16 and 40 1/16 in. long.

Before the adoption of plastic sill tracks, Anderson was using hard maple. This was unsatisfactory because swelling, shrinking, and warping caused the sliding sash to jam, and because exposure to the elements necessitated frequent painting or varnishing.

The Kys-Ite sill tracks will not stain, rot, or splinter; they are impervious to insects; their color is molded in; they allow the window sash to glide easier; and the tracks do not wear out as easily. They have a maple grain finish.

The tracks are molded under 4000 p.s.i. pressure in hardened steel dies. Full size preforms are drawn off automatically on vacuum screens from a slurry of resin and pulp. The preforms facilitate mold charging and insure proper distribution of the material in the mold. Hard chromium plated die surfaces make for ease of ejection, lustrous finish on the piece, and long mold life. The under sides of the pieces are cored.

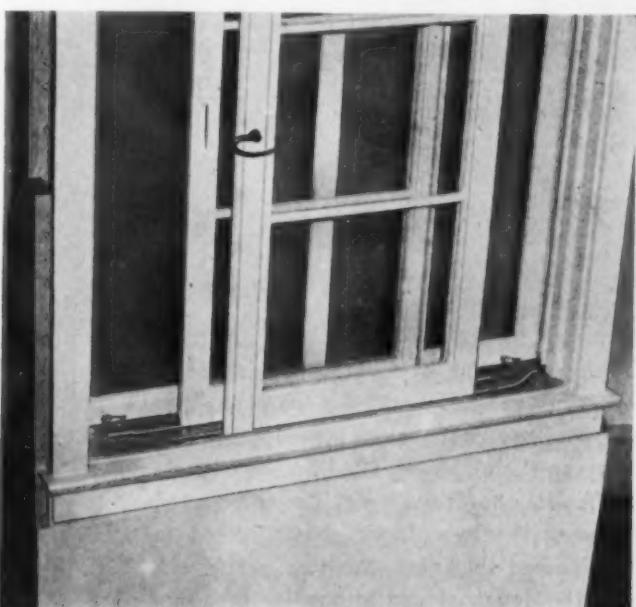
In operation, steel glides on top and bottom of the sash slide horizontally in the molded tracks. The sash are in line in the closed position. When the window is opened, one sash glides into an inner track so as to pass the other.

Window sill track over 5 ft. long is molded in one piece under 4000 p.s.i. pressure. Full size preform is used

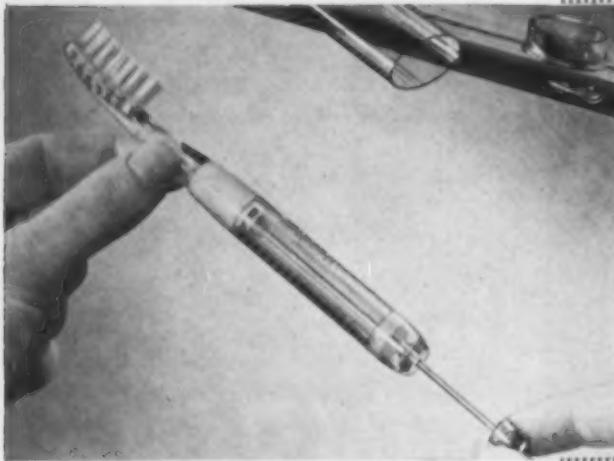


Sill track molded of phenolic resin with long fiber wood pulp filler will not stain, rot, splinter, or fade, and will outwear hard wood. Maple grain finish is molded in

Steel glides on top and bottom of sash slide in molded tracks. Sash are in line in closed position, but one sash glides into an inner track when window is opened



# PLASTICS PRODUCTS



Handy for trips is Dr. Walker's fountain toothbrush put out by Holiday Mfg. Co., Grand Island, Neb. The brush body and caps for the handle and carrying case are Tenite II cellulose acetate butyrate; piston is of Vinylite material; bristles are nylon. Nebraska Plastics, Inc., Cozad, Neb., molds case of clear Tenite I cellulose acetate



Tedious cleaning of rolling pin and pastry board is avoided with this new Bakelite polyethylene pastry cloth manufactured by Greyshaw Inc., 55 W. 42nd St., New York, N. Y. Dough, for example, is simply placed between the two plastic sheets, rolled to the desired thickness, the film peeled off, and the dough placed in position in a pan



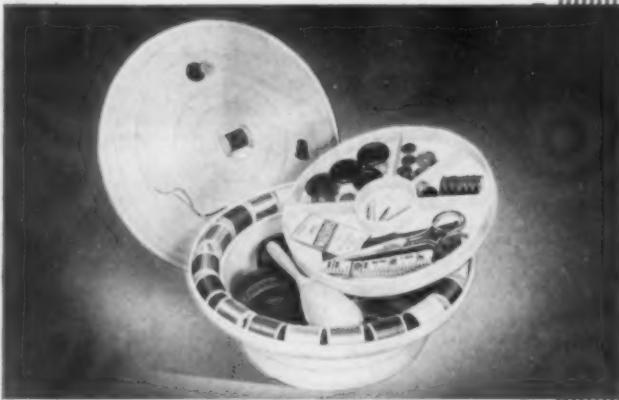
Fashionwise vacationists will like these matching Celluloid sunglasses and earrings fabricated by Nu-Site Optical Frame Mfg. Corp., 12 E. 12th St., New York, N. Y. Nitrate strips with gold, silver, or pastel finishes are cemented to plastic bases to provide a range of color combinations



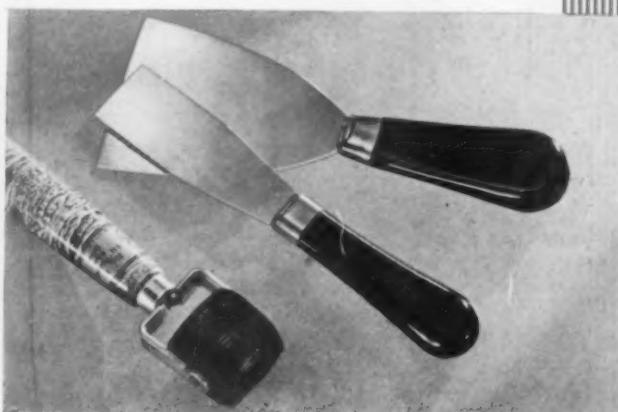
Professional or amateur photographers can print pictures with split second accuracy, using this Chronolux timer which is now being manufactured by American Time Corp., Springfield, Mass. The unit has a range of 1 to 60 seconds. REC Mfg. Corp., Box 323, Holliston, Mass., compression molds this new timer housing of phenolic



Skillful internal carving gives these occasional lamps added beauty and depth of color. Classic Studio, 201 E. 37th St., New York 16, N. Y., fabricates the top of Plexiglas, the inner lighted base of Catalin



There's room for 27 spools of thread, a darning, etc., in this hand-painted Lustron polystyrene sewing box. Molded by A. J. Desimone Corp., 180 Putnam St., Paterson, N. J., for Walter Wagner Corp. at 1132 East Ridgewood Ave., Ridgewood, N. J.



The wall-paper seam roller and the handles of the scraper and putty knife are molded of Durez phenolic because of this plastic's smooth glossy finish, immunity to paint solvents, and durability. Put out by the Ridgely Trimmer Co., Springfield, Ohio



Ten pairs of stockings may be hung at one time on this folding Lustron polystyrene Saftidri dryer. Molded in a variety of colors by Continental Plastics Corp., 308 W. Erie St., Chicago, Ill., for Donaco Plastic Sales, 225 N. Michigan Ave., Chicago



One zip up the helicopter handle and this propeller goes flying through the air to the delight of youngsters. Northeastern Plastics Inc., 588 Commonwealth Ave., Boston 15, Mass., uses cellulose acetate to mold the two-piece Zip-It because of this material's dimensional stability. The toy is produced in a wide range of colors



Place it in hot water or slip it in the refrigerator—the chemicals inside make this a hot water bottle or an ice pack. Covered with Vinylite plastic film, it is distributed by American Hospital Supply Corp., Evanston, Ill., for Hot-r-Cold Pak Inc., 40 Worth St., New York



Strike him down and Tommy Topple, the roly-poly toppling clown, pops good-naturedly back for more. The toy is molded of red and yellow Tenite I cellulose acetate. Put out by Thomas Mfg. Corp., 80 Clinton St., Newark 5, N. J.



An improved thermostatic control and an illuminated Lucite dial are features of this blanket control box designed by Sanford B. Wells, 146 E. 47th St., New York, for Fieldcrest Mills Div., Marshall Field & Co., Chicago. Housing is urea



Its ability to withstand heat and electrical arcing led to the use of Beetle urea formaldehyde in this ivory Sierra Triplex receptacle with matching wall plate. Manufactured by McDonald Mfg. Co., 544 E. 31st St., Los Angeles, Calif.

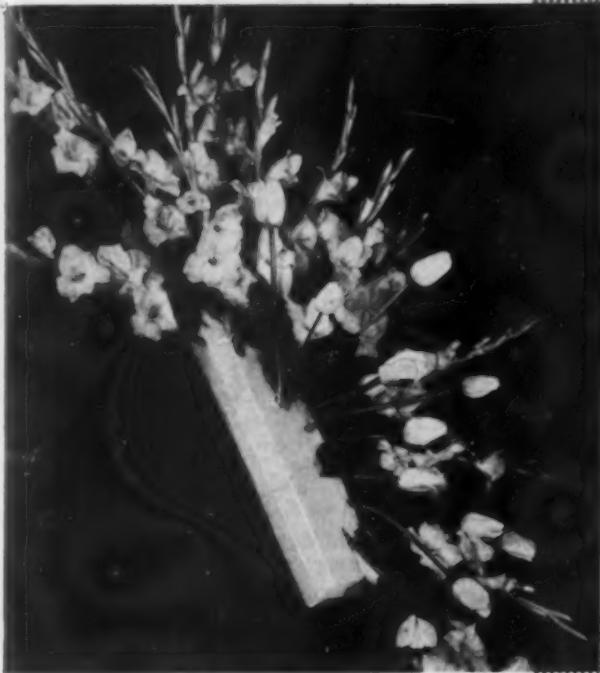


For office use or travelling is this compact nylon bristled flat clothes brush, made by Tek Hughes, Inc., 500 Fifth Ave., New York, in red cellulose acetate butyrate or clear, blue, or rose Lucite

Flori  
styre  
saver  
wire  
thrus  
keted  
Metc

Home  
touch  
board  
Co.,  
cellulo  
measu  
Soben  
Versal

# PLASTICS PRODUCTS



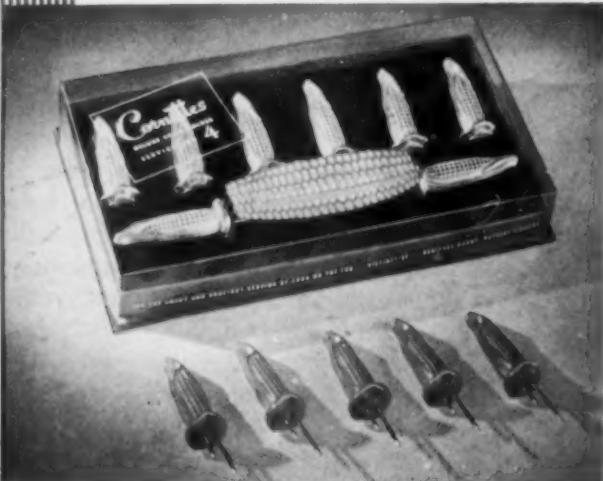
Florists will find this Styrofoam polystyrene base for floral sprays a time-saver over the conventional moss and wire type. Flower stems are simply thrust into the foamed plastic. Marketed by Modern Floral Designs, 914-24 Metcalf Ave., New York 61, N. Y.



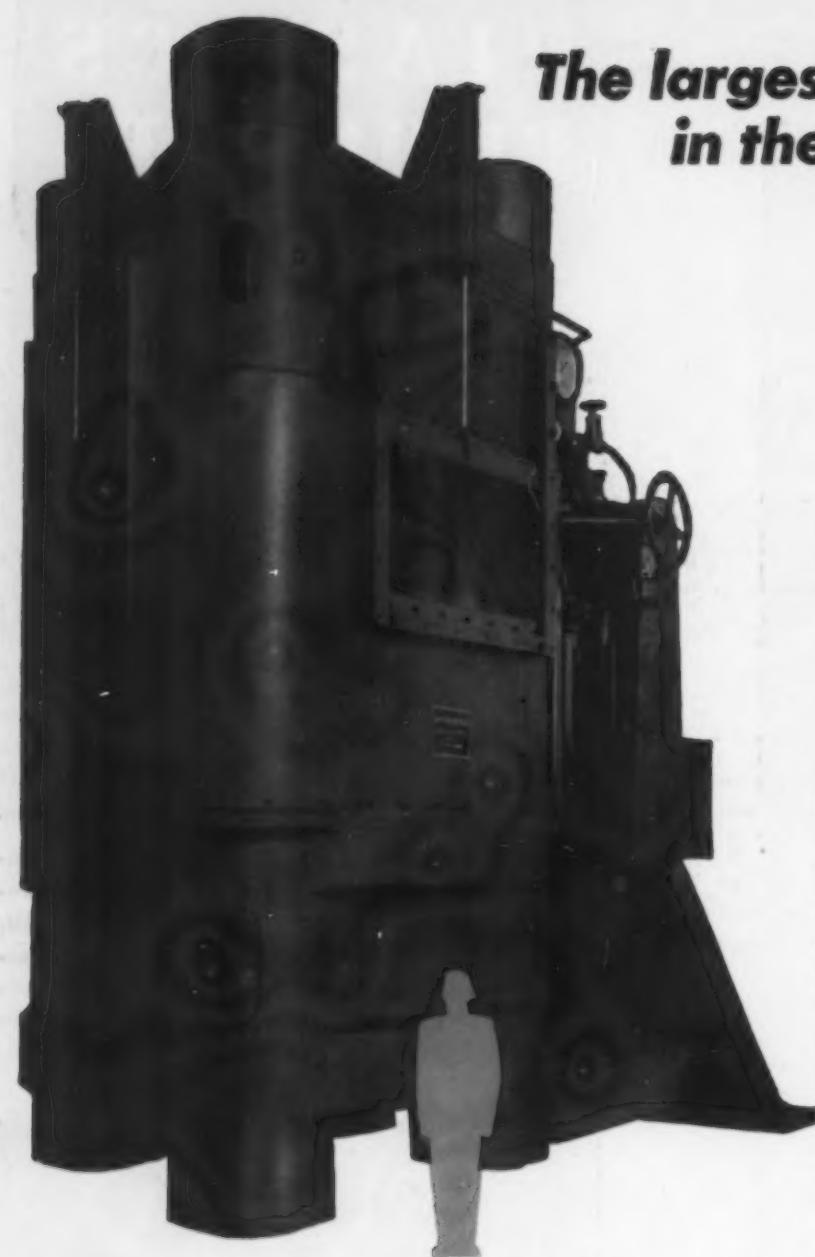
Home shampoos take on a professional touch with this folding chair and drainboard distributed by Sears, Roebuck & Co., Chicago. The yellow Tenite II cellulose acetate butyrate drainboard, measuring 13 by 11 1/4 in., is molded by Sobenite, Inc., South Bend, Ind., for Versal, Inc., 719 N. Wilber, South Bend



Record pivot holes which have been enlarged through frequent playing on automatic record changers can be easily repaired by cementing this Vinylite plastic disk around the record center. Made by Penlee Mfg. Co., Dubuque, Iowa



There'll be no burned buttery fingers if the corn-on-the-cob addict uses these attractive hand-decorated Cornettes molded of Lustron polystyrene by Waterbury Companies, Inc., 835 S. Main St., Waterbury 90, Conn., for Howard L. Ross Associates, 17 E. 42nd St., New York. Prongs are tarnishproof and patented flange keeps fingers cool



## The largest hobbing press in the plastics industry

Hobbed Cavities  
by Midland ...

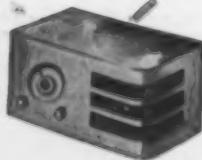
An important addition to Midland's expanding facilities is this 8000 ton hobbing press, the largest of its kind in the plastics industry.

This mammoth press with a ram diameter of 39½ inches makes it possible for Midland to hob cavities of approximately 80 square inches . . . almost tripling former hobbing limits.

With this press, Midland is prepared to supply plastic molders with hobbed cavities for large plastic parts including radio cabinets, large container escutcheons and instrument housings. Multiple cavities can be hobbed . . . "like peas in a pod" . . . quickly, with complete uniformity and accuracy. Multiple cavities will speed up your production with a minimum of expense.

Midland experience and facilities, in addition to skilled craftsmen, are ready to serve you . . . to produce the finest and deliver on time when you specify "Hobbed Cavities by Midland."

Write for your copy of "How to Heat Treat Hobbed Cavities," a practical heat treating treatise to help you get the best performance from Hobbed Cavities by Midland.



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Escutcheons



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F. B. STANLEY, Engineering Editor

# Casting Techniques for Polyesters

PLASTICS  
ENGINEERING\*

by WENTWORTH WEEKS

These resins can now be cast at room temperature in inexpensive multiple molds of rigid or flexible construction to produce many types of objects impossible of manufacture by other techniques.

Unlimited colors, transparent or opaque, good chemical and heat resistance, and a range from hardness to flexibility can be obtained by correct choice of resin and cure.

THE resins grouped roughly under the name "polyesters" may prove highly important to the plastics industry, despite obstacles of misunderstanding and misconception which have beset their path. Because polyesters are easily cast, there is grave danger of their damnation as a hobby and crafts material, or as a slightly superior medium for the plaster caster or, equally as bad, as a substitute for older castable resins. Because casting procedure is at sharp variance with accepted methods of working plastics, potential producers hesitate to learn new rules. Perhaps worst of all, the feature of castability obscures many of the unique properties obtainable in the cast products—properties in the aggregate unparalleled in any other plastic group.

Polyesters are—here and now—usable production casting materials, however much more they may improve with time. Only inexpensive molds<sup>1</sup> are needed. Room-temperature cures are frequently feasible. Complicated decorative or utilitarian objects can be turned out in more than reasonable quantities with only rudimentary equipment. By choice of resin and cure, the producer can select water-white, clarity or unlimited color—transparent or opaque—rigid hardness approaching that of urea or the soft flexibility of a near-elastomer. He can have heat resistance as high as 450° F—and almost any polyester will withstand boiling water. Chemical resistance and electrical properties are excellent;

there are flameproofing and self-extinguishing types. Other properties allow specialized applications.

True, not every polyester resin has every one of these properties, but by suiting material to purpose, sound and salable merchandise can be produced to sell at a profit. True, also, no competition in volume with injection and compression molding can be visualized at this time. The cycle of casting, although brought down to minutes in many cases, is still overlong for single expensive molds. Multiple, inexpensive cavities are definitely indicated, with 5000 to 10,000 runs rather than 50,000 to 100,000 as a production basis. But the range of qualities available, equalling or surpassing many other plastics, indicates an adaptability to new and unconventional techniques that is stimulating to the imaginative.

## Versatility explained

These still-newcomers to the plastics scene have a complicated pedigree which goes far to explain their versatility. True polyesters are unsaturated alkyds dissolved in liquid monomers, frequently styrene or its relatives. Alkyds alone cure slowly; their main use heretofore has been in baked-on finishes or as plasticisers. When thinned with monomers, they become pourable and copolymerize into completely different end-products, varying as the alkyd and monomeric constituents vary in type and proportion. Lumped into the same general category are two other groups of resins: unsaturated monomers of high molecular weight, such as the allyl esters, and partially polymerized monomers known as prepolymers. Still a fourth group is composed of any or all of the other three plus sundry additives. Thus an almost unlimited number of formulations becomes possible.

All have one thing in common. Add a suitable catalyst and these liquids of varying viscosity turn into solids without pressure, without more than moderate heat, if any, and with a speed that can be reduced to minutes. The reaction is irreversible and the resultant resin is classed as thermoset.

Low pressure lamination gave these polyesters their start and still absorbs the predominant propor-

\* Reg. U. S. Patent Office.  
<sup>1</sup> See "Mold Techniques for Polyester Casting," by Wentworth Weeks, MODERN PLASTICS 25, 115-119 (July 1948).

tion of output. But, given a substance polymerized by catalysis, virtually without external forces, to bond fiberous matter together, and it was no great step to put the same or similar substances into molds, with or without fibers, to polymerize into three dimensions. Intensive laboratory work improved catalysts and cures. Draw-backs were eliminated one by one. And a new class of working materials stands ready for the plastics manufacturer.

Three problems involve each other—time, exotherm, and shrinkage. Most monomers polymerize in time without outside attention, but the time may be months or years. Catalysts speed up the process—heat, peroxides, and ultra-violet being the classic trio; for years the standard polymerization formula has been to add benzoyl peroxide and heat.

Once started, the reaction sustains itself, giving off heat which accelerates the action still further. This is the exotherm referred to; just another name for the giving off of heat. If this heat is not removed, low-boiling monomers volatilize, causing the voids

or bubbles unhappy familiar in methyl methacrylate or styrene castings. In addition, as the molecules link up they move imperceptibly closer together, adding up, with the millions involved, to an over-all shrinkage as high as 20% with some monomers. This works directly counter to the expanding influence of the heat, causing unendurable strain and cracks as the resin solidifies, unless the heat is removed. Thus, with all ordinary monomeric materials, meticulous control and elaborate instrumentation, is needed to maintain the balance between necessary speed of reaction and supportable exotherm, while still turning out usable end products.

#### Less critical control

Polyesters require far less critical control. Being already partially polymerized, there is less reaction, lower exotherm, and far less shrinkage. Otherwise the problems are much the same. In the standard two-step cures recommended for many casting resins—see Fig. 1—a preliminary period at room tem-

#### BASIC TWO-STEP CURES FOR CERTAIN RESINS

TIME/TEMPERATURE (1/8-in. SECTION)

DIALYL PHthalate

1% DTBP

PHORESIN/POLYESTER, 3/7

1% TBPB

1% BZO

ACRYVIN (Acrylic)

2% CAT\*

(\*Heated to 100°C with 1%  
(Cooled to 60°C and other 1%  
added—prior to cure)

PHORESIN PREPOLYMER

3% BZO &

1/2% TBPB

MARBLETTE 869 (Phenolic)

10% B342

VIBRIN 103, 140, 106

1/2% BZO

1% BZO

KRISTON (Allyl)

2% BZO

PARAPLEX P-13

1% BZO

SELECTRON 5026

1/2% U60

SYNVAR V-30

2% V-21

PARAPLEX P-43

2% U60

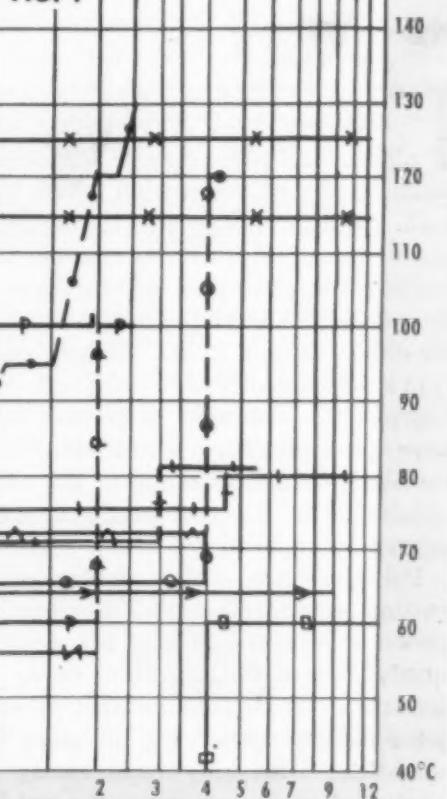
MR RESIN 26C

1% 1HCH1

LAMINAC 4116

2% B323

FIG. 1



SELECTRON 5026

1/2% U60

PLASTITOOL (Phenolic)

10% CAT

DUREZ 87422A (Phenolic)

8% B3422

BZO-Benzoyl Peroxide, U60-Uniperox 60, DTBP-Di-*t*-Butyl Peroxide, TBPB—*t*-Butyl Perbenzoate, TBHP-*t*-Butyl Hydroperoxide, 1HCH1-1-Hydroxycyclohexyl Hydroperoxide-1, CAT-Mfrs. Catalyst

(Based on information furnished by manufacturers of resins)

perature or low heat takes care of the change from liquid to a gradually hardening gel, while the exotherm rises and subsides. Then the heat may be raised for final cure with no danger of damage to the casting. Even this relatively simple procedure is a vast step beyond the complicated control and cooling devices required for other monomers, but the work of resin and catalyst manufacturers bears further fruit.

Naturally enough, increasing the amount of a catalyst steps up the exotherm and reduces the time required for gel and cure, subject to the hazards discussed earlier. This is shown graphically in Fig. 2. But different resins react differently—in speed, in exotherm, and even in end product—with the same catalyst in the same quantities as shown in Fig. 3. On the other hand, the same resin will react differently with different catalysts—see Fig. 4—and new catalysts are constantly being investigated. The aim of each resin manufacturer has been to find the catalyst giving fastest cure with lowest exotherm for his particular resins, and remarkable progress has been made. It has even been stated that the exotherm can be held below 150° F without impairing the qualities of the finished casting, the whole reaction taking place at room temperature in as little as 3 or 4 minutes.

In many instances, cure will be possible at room temperature. In many others, the user of polyesters can obtain a hard gel and free his molds, curing the casting out of the mold to expedite the cycle. Figure 5 shows some of the room temperature cures and gelation schedules available. He will still find it necessary to pilot each casting of different weight and dimensions to set the optimum catalytic system for that particular run. This is routine and is necessary since the exotherm builds up as thickness increases and escapes with increasing difficulty. Often, therefore, a desirable fast cure must be lengthened to insure a perfect casting. The simplest method of check is by a preliminary line-up of 5 to 10 molds, with the best preliminary estimate on catalyst concentration poured in the middle one and variations up and down on either side. The best result—in time and casting quality—sets the standard for run.

### Production equipment

Some basic equipment is needed to set up production. Even though much work can be done at room temperature, an oven is usually the first step. The best is the circulating air type, gas or electric, with accurate thermostatic control and heating elements well insulated and shielded. Inflammable and explosive vapors are given off by one or two types of resin during cure, where monomers are especially low-boiling. A portable power mixer and large glass containers simplify batch catalyzation or addition of color and filler. Accurate scales, for weighing out proportions, are also essential. Some

elementary laboratory equipment, including a titration setup, will save time in piloting but need not be over elaborate. Little more is required.

It is advisable for the putative manufacturer to prepare for mass production of molds, even though the masters or positives are obtained from outside sources. Since the cycle, however expedited, is still too slow for dependance upon single cavities, multiple cavities are an important cost element. Unless unit cost is kept low, the advantages of casting over other production methods are minimized.<sup>1</sup>

Pouring the resin into these molds can be as simple as pouring plaster, or the process may be mechanized to a considerable degree. There is nothing wrong with lining up molds on a table, mixing a batch of resin, and walking up and down the line with pitcher in hand. In fact, it is being done. Batch mixing, however, demands a gelation time set sufficiently slow to permit pouring all of the mix before the resin becomes unusable. Wear and tear on shoe-leather is cut down by using gravity feed and bringing molds by tote cart or conveyor to a pouring point. Such a feed can be as simple as a glass container or drum set up on a shelf, tapping off the mix from the bottom to avoid entrapped air.

Promoter-catalyst systems can be prepared in sizeable quantities by proportioning the required promoter for the whole to half the resin and the required catalyst for the whole to the other half. These, properly adjusted, can remain stable while unmixed for 24 hr. or longer, setting up in a matter of minutes when combined. By feeding tubes from the base of each container to a T-connection, the joined stream contains equal portions of each, ready for the mold. Glass connections and vinyl chloride tubing can be used, with a tapered glass outlet drawn to reduce the flow to any desired mold orifice and a simple shut-off clamped to the flexible tube. The only clogging will be in the section between T and outlet, easily cleaned or replaced. Some such simple setup will handle 100 gal. or more at a mixing.

Equally simple systems can be used to feed in fixed proportions of catalyst to resin, using tubing of different gage, dropping devices, or flow meters. Gravity can be supplemented by pressure in some cases, or by the control of air admitted to containers holding ingredients. Tailoring of such simple systems presents no special difficulty once the general catalytic system has been decided upon, and can easily be adjusted to changes in mold size or cure time. In practice they prove superior to batch mixing and may mean the difference between a sound production setup and ordinary custom casting.

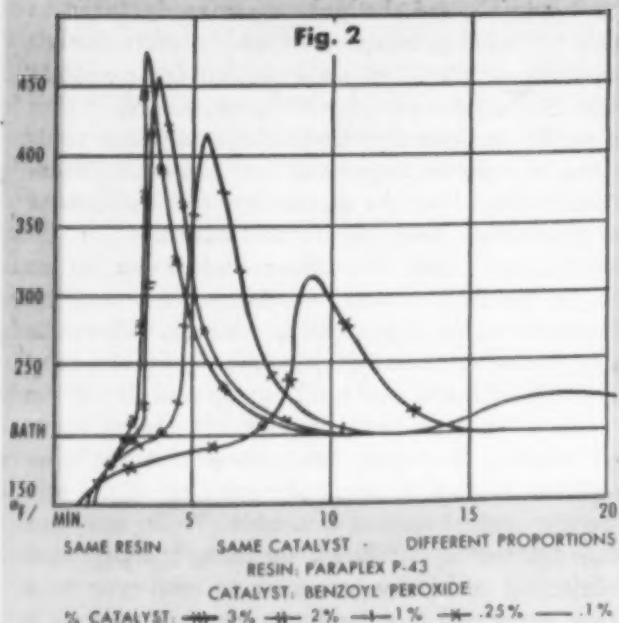
### Cure out of mold

It is frequently desirable to cut down mold dwell and reduce wear on molds by removing castings at a stage where they are solid and tack-free, but still slightly flexible, and to complete the cure out of the

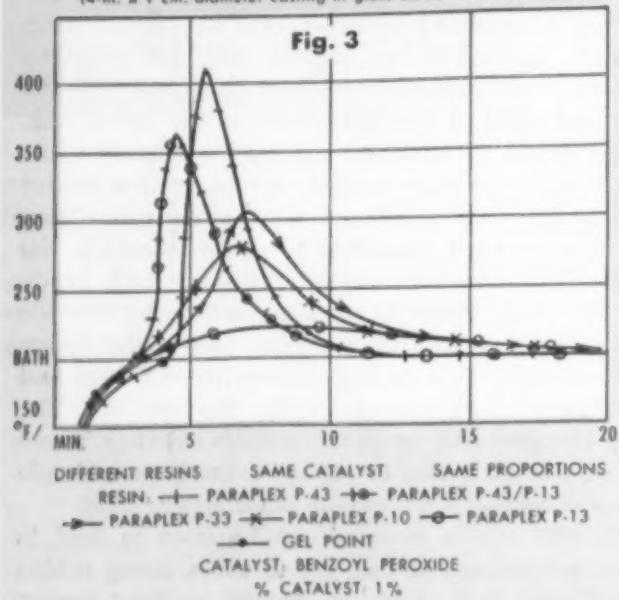
## EXOTHERM CURVES

TIME/TEMPERATURE  
SHOWING VARIATIONS WITH DIFFERENT  
COMBINATIONS OF RESINS AND CATALYSTS

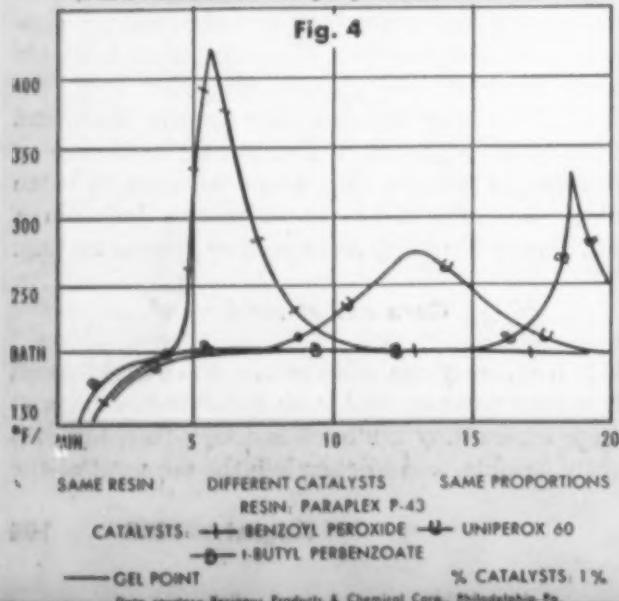
(4-in. x 1 cm. diameter casting in glass cured in 200° F bath)



(4-in. x 1 cm. diameter casting in glass cured in 200° F bath)



(4-in. x 1 cm. diameter casting in glass cured in 200° F bath)



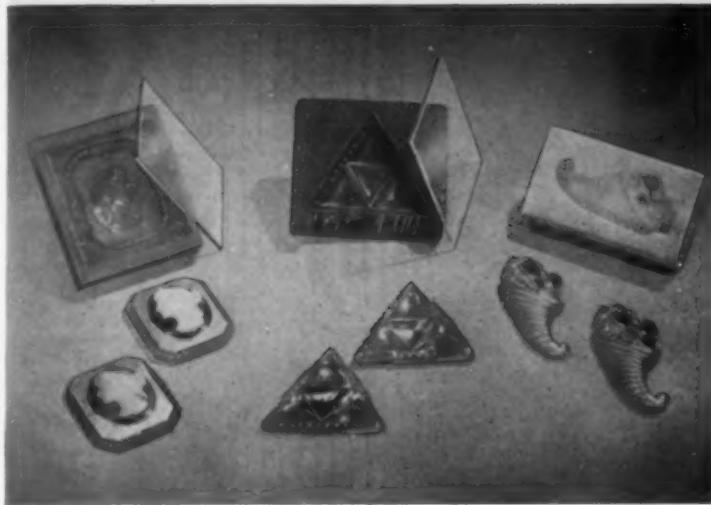
mold. This is the gel stage referred to in earlier paragraphs and it allows great latitude in accessory techniques. Parts may be assembled at this point, using a small amount of additional resin as adhesive, and cured into one coherent piece of plastic. Different physical properties may be merged into a single casting by this means. Successive pourings and gelations can be used to combine different colors, or transparencents with opaques. Faulty castings can sometimes be repaired, leaving no trace of flaws in the final cured piece. Even some limited forming can be done, choosing the right point of gel and using reasonable precautions, such as shaping objects poured flat to slight curves. All such bonds and shapes are completely set in cure.

Large objects removed in gel and cured out of the mold may require supporting jigs, since there is some slight softening in the earlier stages of post-cure. These jigs can be cast of suitably sealed plaster or may be made of metal, but should be coated with a separator to prevent sticking. Shrinkage will occur during this curing stage with many resins and, where dimensions must be held inviolate, inserts can sometimes be employed although extreme care is needed to prevent cracking.

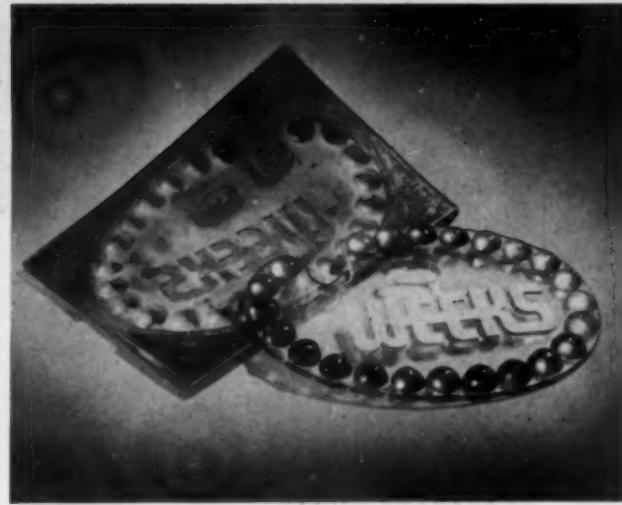
It will be found that surfaces exposed to air, as in open mold pourings, will often remain tacky even after cure. The nature of this characteristic is debatable. While generally classed as inhibition by air, it seems more likely that such surfaces lose styrene or similarly volatile cross-linking agents during exotherm, leaving an alkyd residue which does not cure readily. Protection with layers of water or glycerine, or curing in bath, scarcely fit production needs; using glass covers, which might trap air bubbles, or cellulose films, which may leave ripple marks, seems equally tortuous.

Castings made in open molds may be turned tacky-side down upon sheet metal or glass which has been coated with separator, following their removal in gel, and cured in that position. The formerly exposed surfaces will then cure equivalently to the others in firmness. Castings from closed molds present no similar problem where a pouring sprue is used, since only the end of such a sprue, which is cut off in finishing, will be affected. Where the actual base of an object is left exposed, the tack has been used successfully to attach felt or foil while the surface is in the gel stage. If, however, such surfaces are left untreated, and remain tacky after cure, they may be washed down with solvent or coated with a styrene lacquer which bonds to the alkyd and thereby insures a good surface.

Cooling after cure, whether cure is at elevated temperature or low, should be gradual, and castings removed from an oven should be shielded from direct drafts. This avoidance of sudden temperature changes—either up or down—should be kept in mind in all phases of the operation. Optimum conditions



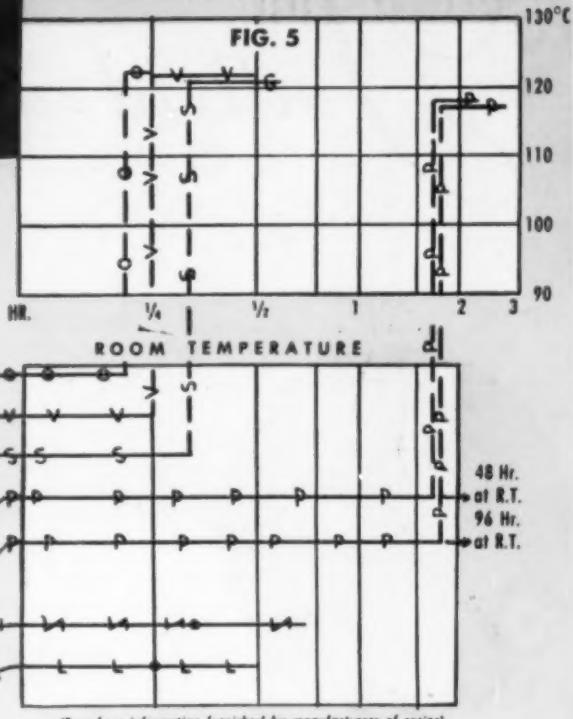
ALL PHOTOS COURTESY MULTI-MOLD PRODUCTS



### ROOM-TEMPERATURE GELATIONS AND CURES FOR CERTAIN RESINS

TIME/TEMPERATURE  
( $\frac{1}{2}$ -in. SECTION)

SYNVAR V-30 . . . 1% Promoter HP-2  
2% Benzoyl Peroxide  
VIBRIN 103 . . . 3% Promoter #4  
1.5% Benzoyl Peroxide  
SELECTRON 5026 . . . 1% SELECTRON 5907  
1.5% LUPERCO ATC  
PARAPLEX P-43 . . . 3% Uniperox 60  
1.66% NUODEX Cobalt  
PARAPLEX P-13 . . . 3% Uniperox 60  
1.66% NUODEX Cobalt  
MR-RESIN . . . 1.2% Accelerator E  
1% 1-Hydroxycyclohexyl Hydroperoxide-1  
LAMINAC 4116/4134  
(75-25 MIX) — 6.8% Catalyst #323  
or #347



Polyester jewelry (top left) is cast in one-piece molds, using hand fill of various colors followed by clear or colored backing after the mold is closed. The findings are inset and anchored by the resin itself. Using a combination of gel with back pouring, the advertising display (top right) containing 25 different colors is cured as one piece of cast resin. Mold makes use of plaster support

for polymerization are a gradual rise in temperature from exotherm into cure without peaks or drops. Gentle circulation of air, in or out of oven, can be helpful in leveling off internal temperature changes, but should not be confused with sudden shock.

Finishing of polyester castings is done in much the same manner as for phenolics, except where the very flexible types are concerned. Dangers of overheating are slightly increased, since a piece will remain somewhat thermoplastic for some time after cure. Sharp rotary files and cut-off disks are best for trimming off sprues and for mandatory shaping. Tools should be kept sharp for tapping and drilling. When the location of holes must be accurate, these should be left out of casting and positioned by a jig or template for post-drilling. Hand files, steel wool, emery cloth, or # 3 to # 000 wet and dry

garnet papers, are useful in special finishing. Garnet sanding discs of 240 grit, followed by rouge and topped off with a wax buff, will give highest gloss. It should be remembered that resins vary on these points. With proper mold surfaces, only a light buffing is needed. Ashing is almost never needed.

One of the chief drawbacks with any polyester is the increase in brittleness that accompanies increasing hardness. While this can be counteracted by mixtures of flexible components, careful formulation of resins is required, especially in thin sections, to obtain true resiliency rather than either flexibility or rigidity. The ordinary limitations of compression or injection upon section thickness can be largely disregarded except where solid masses and thin sections appear in conjunction; in such cases the problem of catalysis adjustment, to cure the thin

Why

A PLASKON MOLDING COMPOUND  
IS USED FOR THE CONTAINER  
OF THIS FAMOUS COSMETIC



Portrait of Mrs. Edge  
Ward of Hollywood by  
Clemens, one of a series  
in the Dorothy Gray Galler  
Fascinating Women.  
Ward, known on the  
stage and screen as Jane W  
is currently featured  
in Enterprise Studios' pro  
duction, "No Minor Virtue."

Individually Dorothy Gray.



and arrestingly at

bec

There  
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Plask  
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color

PLA  
LIBB  
2121  
Canad



attractive in appearance...

because they're made of **PLASKON MOLDED COLOR**

There's no mistaking these world-famous cosmetics. Their quality is distinctively Dorothy Gray, both in design and display of the name. The containers made from Plaskon Molded Color are of a rich glowing hue that enamors the feminine eye, encouraging purchase and use of the cosmetics they hold.

Plaskon Molding Compounds have many advantages in the drug and cosmetic field. Major among these features for containers and closures is the wide range of beautiful colors. From translucent natural and pure white, through lovely pastels and vivid tones to jet black, Plaskon Molded Color is arresting, intriguing, and sales-stimulating. It is solid color through and through.

Molded Plaskon urea- and melamine-formaldehyde compounds are completely resistant to common commercial solvents, and impervious to oils, greases, and waxes. Molded Plaskon is resistant to dilute acids and alkalies. Its naturally smooth, non-porous surface takes on an increasing lustre with continued handling. It is warm and friendly to the touch.

Thermosetting Plaskon Molding Compounds offer welcome economies in closure and container production, and highly effective new ideas in sales promotion. Our experienced field men are available to help you adapt Plaskon Molding Compounds to your individual needs. Write for free book on Plaskon\* Molded Color facts and applications.

\* Reg. U. S. Pat. Off.

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**EXHIBITION**  
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**PLASKON DIVISION**  
**LIBBEY·OWENS·FORD GLASS COMPANY**  
2121 Sylvan Avenue • Toledo 6, Ohio  
Canadian Agent: Canadian Industries, Limited, Montreal, P. Q.

**PLASKON**  
TRADE MARK REGISTERED  
**MOLDED COLOR**



Polyester display figure on the left is shown with elastomeric mold. The figure and background on the right are cast in the same operation. The backing is a stipple finish transparent polyester; the figure an opaque white polyester. Both display pieces are being used by the Terri Lee Doll Co.

sections completely without too great exotherm in the thick, becomes important.

#### Special effects

Fillers of almost any type can be employed in polyester castings. Mineral types tend to step up brittleness while fibrous materials reduce this property. Thus, wood pulp or flock will add greater strength than glass fibers or asbestos, although with subsidiary disadvantages in water absorption. Some metal powders, selected to avoid inhibition of resins or tarnish from solvent or catalyst action, may be employed with good results and special effects can be obtained by letting them settle to the bottom of a mix, to show on the surface of castings. These last can also furnish weight for bases as well as decorative aspects. Very fine materials, such as silica or earths, may be diffused throughout castings to give an interesting hazy glow which is neither true transparency nor opacity. Mixtures of semi-gelled resins with ungelled can give marbled and streaked effects. Foil, embossed materials sized with sufficiently resistant water-base coatings to hold their shape, fabrics, and paper or cardboard can be used for embedment or for support. Fiber-glass cloth, as used in laminating, becomes almost invisible due to the refractive index and will be found useful in reinforcing flat castings.

Almost every experiment opens up new avenues—even to the use of controlled over-catalysis to simulate skeins of golden wire or fine gold leaf trapped within transparent resin. This is, in fact, one of the greatest dangers to the polyester neophyte; he may dash off in pursuit of some purely decorative aspect at the expense of practicability.

#### Potential polyester uses

Polyesters can best be introduced where full advantage can be taken of their special qualifications, rather than to use them as substitutes or replacements. They need to be brought out from the back pages of homecraft magazines and put into the type of production listed in the financial section.

That cannot be done by merely equalling competition in other castable materials, or even by doing the same job better. Polyesters offer far more than a duplication of what has gone before.

The real need is to turn polyesters into salable consumer goods for mass markets. There is a real demand for materials that can be produced in decent quantity without exorbitant tooling-up costs; ask anyone who is launching a new product. There is a need for heat-resistant plastic in every kitchen—for chemical resistance in every bathroom. Flexibility and toughness pay dividends when built into merchandise that takes knocking about. High polish and clear color are less important, but still valuable. Give the merchandise a novelty twist to get it started. With polyesters an idea can reach and test out the market before a setup for conventional production gets to first base. Complicated assemblies ordinarily requiring a dozen sources and a dozen different materials can be completed in two or three simple steps. Ask what other plastics—and many metals—cannot do; ask what the latest methods of yesterday could not attempt. Then do them with cast polyesters.

#### Available Casting Resins

Trade Name	Type	Manufacturer
LAMINAC	Polyester	American Cyanamid Co., 30 Rockefeller Plaza, New York, N. Y.
VIBRIN	Polyester	Naugatuck Chemical Co., Div. of U. S. Rubber, 1230 Sixth Ave., New York, N. Y.
SELECTRON	Polyester	Pittsburgh Plate Glass Co., Grant Bldg., Pittsburgh, Pa.
PARAPLEX	Polyester	Resinous Products & Chemical Co., Washington Square, Philadelphia, Pa.
MR RESINS	Polyester	Marco Chemical Co., Inc., Sewaren, N. J.
V RESINS	Polyester	Synvar Corporation, Wilmington, Del.
CASTOLITE	Polyester	Castolite Co., Kenilworth, Ill.
PH RESINS	Chlorinated styrene	Victor Chemical Works, 141 W. Jackson Blvd., Chicago, Ill.
NBS RESINS	Chlorinated styrene	Mathieson Alkali Works, 60 E. 42nd St., New York, N. Y.
DCS RESINS	Styrene	B. F. Goodrich Chemical Co., Rose Bldg., Cleveland, Ohio.
KRISTON	Allyl	Shell Development Corp., 500 Fifth Ave., New York, N. Y.
DIALYL PHTHALATE	Allyl	Acryvin Corp., 11-08 30th Ave., Astoria, N. Y.
ACRYVIN THIOKOL LP	Acrylic Mercaptan rubber	Thiokol Corp., Trenton, N. J.
DURALON BURITE	Furan Resorcinol	U. S. Stoneware Corp., Akron, Ohio.
CATALIN DUREZ	Phenolic Phenolic	Durite Plastics Co., Frankfort Sta., Philadelphia, Pa.
MARBLETTE	Phenolic	Catalin Corp., 1 Park Ave., New York, N. Y.
PLASTIFORM	Phenolic	Durez Plastics & Chemicals, No. Tonawanda, N. Y.
PHENOPLAST	Phenolic	Marblette Corp., 37-21 30th St., Long Island City, N. Y.
		Calresin Corp., W. Washington Blvd., Culver City, Calif.
		Lockrey Plastics Products Co., 4-16 150th St., Flushing, N. Y.



A ROTATING TENITE GRILLE on this air conditioner directs cool, filtered breezes into any corner of a hot room. So lightweight is Tenite that the touch of a fingertip suffices to send the air stream up, down, or to either side.

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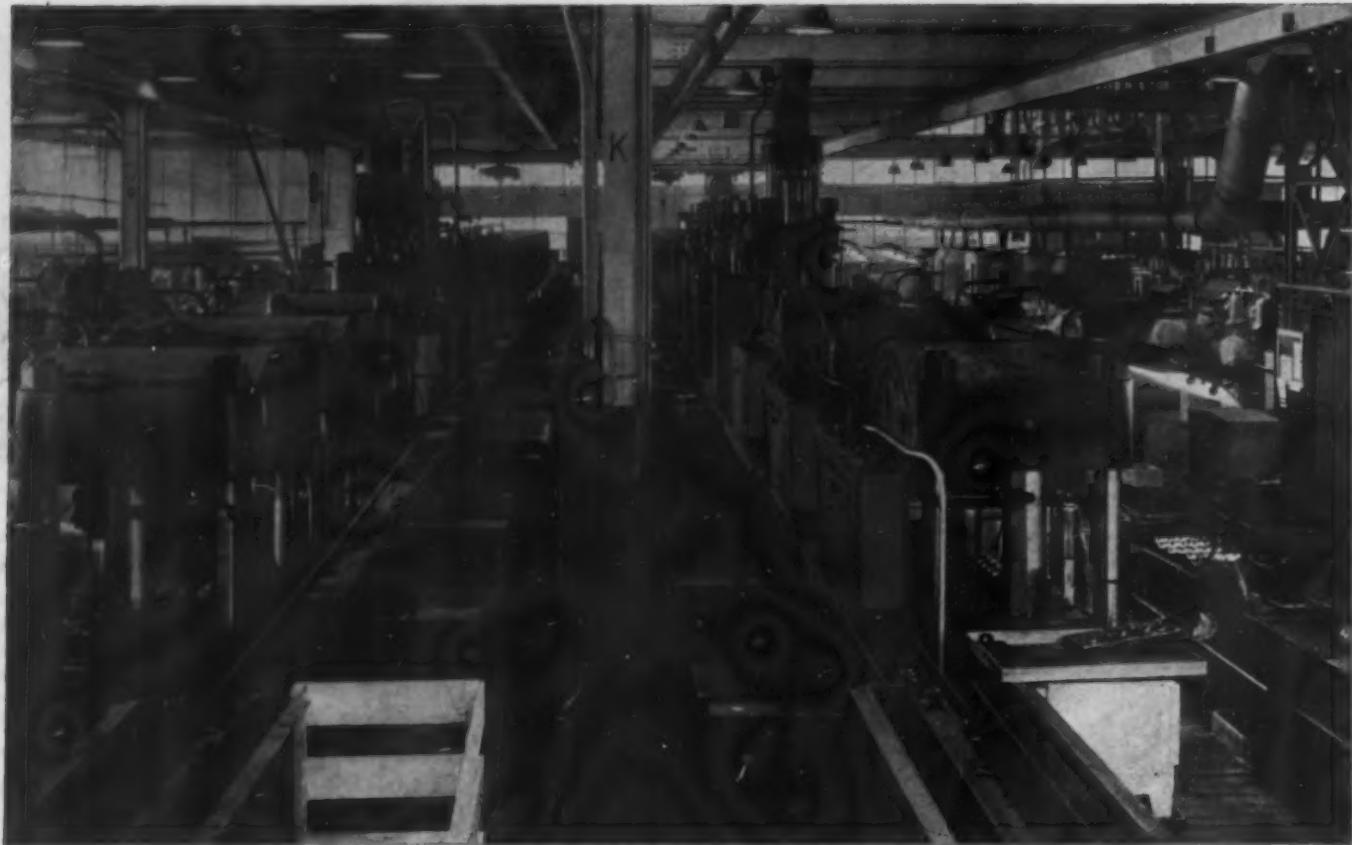
Tenite serves in functional and decorative capacity in many other modern home appliances, including vacuum sweepers, refrigerators, and radios. For more information about Tenite uses and properties, write to TENNESSEE EASTMAN CORPORATION (Subsidiary of Eastman Kodak Company), KINGSPORT, TENNESSEE.



Monitor Air Conditioner marketed by Monitor Equipment Corp., Riverdale, N. Y. Tenite grille molded by Sterling Injection Molding, Inc., Buffalo, N. Y.

Information regarding Tenite is obtainable through representatives located in Chicago, Cleveland, Dayton, Detroit, Leominster, Mass., Los Angeles, New York, Portland, Ore., Rochester, N. Y., St. Louis, San Francisco, Seattle, and Toronto, Canada; and elsewhere throughout the world from Eastman Kodak Company affiliates and distributors.

**TENITE**  
an Eastman  
**Plastic**



In this general view of the Ford compression molding department, a flash removal conveyor is in operation on the line of 18 presses at right. These presses are equipped with hoods which confine flash and cause it to drop upon a moving belt. A similar conveyor is under construction at left

## Flash-Removal Conveyor

REMOVAL of thermosetting flash from compression molding plants is a problem which varies in proportion to the number of presses in a given installation. In a multiple-press installation, the amount of flash accumulated in several hours of operation may reach a considerable volume and constitute a serious housekeeping problem. When presses are somewhat inaccessible, it is difficult for the cleanup man to do a thorough job of sweeping flash from the floor. Even more serious is the possibility that pieces of flash may work their way into the press cylinders, scoring them and increasing maintenance difficulties.

In the plastic molding plant of the Ford Motor Co., Dearborn, Mich., a conveyor installation, company designed and built, has recently been placed in operation to meet the problem of flash disposal. This installation, serving 18 compression molding presses ranging from 250 to 500 tons in capacity, includes metal hoods enclosing the back of each press, positioned over a continuous belt conveyor on which the flash is carried and dumped into a drum at the far end of the system. A similar installation, which will

serve another battery of 18 presses, is now under construction.

### Working round the clock

The Ford compression molding equipment, which includes several transfer presses, is operating on a round-the-clock schedule producing distributor and coil parts and other electrical items used in the company's passenger cars, trucks, and farm equipment. General purpose phenolic material is used on the coil parts, with high dielectric phenolic specified for distributor components. The compression presses are arranged in two parallel banks of 18 presses each, making it somewhat difficult to do a thorough job of flash cleanup because the two rows are back-to-back. This layout, however, is ideal for the type of flash removal conveyor which Ford has installed.

The hoods were fabricated of 0.125-sheet steel to fit the individual presses. Of welded construction, they are designed so that they fit close to the back of the press in order to confine flash which is blown from the opened dies at the end of each molding cycle. Hoods are fitted with open-end clamps which



A press equipped with a metal hood for flash removal may be serviced without difficulty through a rear sliding door



Flash from a 21-cavity coil case mold in a 500-ton press is being blown into hood. From here it will be taken by conveyor belt to a drum at far end of the system. Edge of hood and conveyor can be seen at lower right of picture

At delivery end of the conveyor belt, flash accumulated from 18 compression molding presses in the setup tumbles into a drum instead of being scattered on floor around the individual presses

rest directly on the angle irons forming the supporting structure of the conveyor. On the larger presses, they are bolted to the presses for support. Sliding access panels on the backs of the hoods make it possible to service presses from the back without removing the hoods.

The 8-in. woven fabric belt which carries the flash passes under the hoods, moving at a constant speed of 27.36 ft. per minute. Flash blown to the back of the hoods drops directly down upon the belt and is prevented from spilling off the sides by the flanges of the channel irons forming the supporting structure for the conveyor. The entire structure rests on angle iron vertical supports anchored to the floor at regularly spaced intervals.

#### Speed reducers used

Total length of the conveyor is 170 feet. It is powered by a 1½-hp. Westinghouse constant speed motor directly connected to a Ford standard speed reducer with a ratio of 114.75 to 1. A further reduction of approximately 3 to 1 is secured in the chain and sprocket drive between the speed reducer and the drive pulley which moves the belt. Stop and start buttons for the conveyor are installed near the delivery end of the installation, adjacent to the enclosed drive mechanism.

Although the first conveyor has been in full operation only a short time, Ford molding plant officials state that it has greatly eased the housekeeping problem on this battery of presses. Full benefits of the new system, however, will not be attained until the second conveyor is placed in operation on the other line of presses. At present, flash from the conveyor empties into a large drum, but provision may be made later for dumping the waste material through the floor into a waiting truck in the basement.



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After more than three years of experimentation and evaluation, Cyanamid has developed a urea material with faster curing characteristics than any developed heretofore.



faster close.....less gas.....

BEETLE, Medium Flow, FC (fast cure) maintains all the other desirable qualities of standard BEETLE. But because of its fast curing properties it gives the thermosetting molder definite cost and production advantages in producing many items in which either thermosetting or thermoplastic compounds may be used.

Tests indicate that BEETLE Medium Flow, FC (fast cure), may shorten cure times by as much as 45% to 68% over standard urea materials. These results were obtained in test runs on closures, clock cases, radio cabinets, watch boxes, shaver cases, buttons. In some instances production increases up to 89% were achieved!

This is another typical instance of how Cyanamid is using its extensive research facilities to improve its products and increase molders' profits. For full information on BEETLE Medium Flow, FC (fast cure) and other Cyanamid plastic molding compounds, write Plastics Department, American Cyanamid Company, 32 Rockefeller Plaza, New York 20, New York.

Reg. U. S. Pat. Off.



# for molders of BEETLE<sup>\*</sup> plastics

## **CUTS MOLDING TIME AND COSTS**

This new compound, designated BEETLE, Medium Flow, FC (fast cure), offers the molder at least four profit-making advantages:



.....shorter cure.....better finish

## **TYPICAL CURE-TIME REDUCTIONS**

Radio housing.....38%

Watch box.....25%

Cosmetic closure.....25%

Buttons.....50%

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Plastics  
*AMERICAN Cyanamid COMPANY*

The life force of the modern motor car flows through the electrical circuit. Vital to this power is the Fasco Automatic Reset Circuit Breaker, used as original equipment by most of the leading automobile manufacturers. The molded component shown here is an integral part of this product.

• Phenolic component with metal inserts  
molded-in, by Plastic Manufacturers, Inc. for  
F. A. SMITH MANUFACTURING CO., INC.



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INJECTION • TRANSFER & COMPRESSION MOULDING  
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# Laminates from Purified Cotton Linters Sheet

## TECHNICAL SECTION

by MILTON GALLAGHER and RAYMOND B. SEYMOUR\*

This report describes one phase of an investigation on the reinforcement of plastics with various materials in the form of sheets, non-woven textiles, and woven fabrics. In this portion of the program which was sponsored by the Southern Chemical Cotton Company, the reinforcing material used was purified cotton linters sheet manufactured by this firm, designated as Grade 10, having a thickness of 0.045 in. and weighing 40.6 g. per sq. ft. These sheets were highly absorbent, clear white in color, and contained 99.0% alpha cellulose. Second cut cotton linters having a fiber length of 0.1 in. or less served as the raw material for the manufacture of the purified sheet. The product has been used as a source of pure cellulose in the manufacture of cellulose derivatives.

**N** THESE experiments, chemical cotton sheets were impregnated with polyester, phenolic, and thermoplastic resins and the built-up laminates were cured after removal of solvent and/or air as required.

**Polyester resins**—Sheets of chemical cotton were impregnated with the catalyzed resin and laminates comprising 5 plies which were built up were wrapped in cellophane and cured at pressures of 100 p.s.i. or less and according to the cycle of temperature recommended by the resin manufacturer.

**Phenolic resins**—Sheets of chemical cotton were immersed in either aqueous or alcoholic solutions of the resin and dried first at room temperature and then at 110° C. Five impregnated sheets were wrapped together in cellophane and cured at 1000 to 2000 p.s.i. and at the temperature recommended by the resin manufacturer.

\* Industrial Research Institute, University of Chattanooga, Chattanooga, Tennessee.

**Thermoplastic resins**—Sheets of chemical cotton were immersed in solutions or aqueous emulsions of the thermoplastic resins and dried first at room temperature and then at 110° C. Four impregnated sheets were wrapped together in cellophane and molded by heating to about 130° C. under a pressure of 1000 to 2000 p.s.i. in a Carver laboratory press. The temperature was lowered to about 100° C. before removing the laminates from the press.

### Testing methods

For the determination of tensile, compressive, and flexural strengths as well as Young's Modulus in flexure, a Dillon testing machine, Model K, was used. In order to check the manufacturer's calibration of the testing machine, Young's Modulus in flexure for a cold rolled bar was determined and found to be within 1% of the published value of 3,000,000 p.s.i. for this material.

Test specimens, after having been sawed from the test panels, were reduced to specified dimensions on

TABLE I.—Effect of Specimen Thickness and Direction of Test on Properties of Laminates Made with Thalid X-530

Resin	Panel 0.145 in. thick	Panel 0.260 in. thick	Panel 0.280 in. thick
No. of plies	4	8	8
Direction of test	long.	long.	trans.
Tensile strength, p.s.i.	4800	4800	5250
Flexural strength, p.s.i.	7750	7200	8250
Young's modulus in flexure, 10 <sup>6</sup> p.s.i.	5.5	5.3	6.2
Edgewise compressive strength, p.s.i.	11,250	10,750	10,000
Specific gravity	1.27	1.22	1.19
Rockwell hardness	M29	M41	M41
Water absorption, %	7.1	4.8	8.7
Resin content, %	63	61	60

TABLE II.—Properties of Laminates Made with Various Polyester Resins<sup>a</sup>.

Resin	Tensile strength	Edgewise compressive strength	Flexural strength	Young's modulus in flexure	Rockwell hardness	Water absorption	Specific gravity	Resin content
Thalid X-530	p.s.i.	p.s.i.	p.s.i.	10 <sup>5</sup> p.s.i.		%		%
Vibrin 103	5,250	10,000	8,250	6.2	M41	8.70	1.19	60
Vibrin 132	6,000	13,500	11,000	4.0	M72	3.95	1.30	57
Vibrin 140	6,750	21,000	11,750	4.6	M93	2.16	1.36	58
Vibrin X-1002A	5,000	12,250	7,500	4.0	M61	2.13	1.39	60
Vibrin X-1201	5,400	15,000	8,250	3.5	M81	2.55	1.35	57
Selectron 5003	2,400	1,800	1,600	1.9	—M6	9.85	1.23	53
Selectron 5200	6,250	21,250	13,000	8.0	M98	0.95	1.31	60
Selectron 5401	1,250	850	1,100	1.0	—M16	9.72	1.17	55
Paraplex P-33	6,000	14,000	9,750	6.3	M86	4.61	1.22	57
	4,250	4,250	3,400	2.2	M23	4.25	1.27	58

<sup>a</sup> Sources of resins: Thalid X-530: Monsanto Chemical Corp., St. Louis, Mo. Vibrin resins: Naugatuck Chemical, New York, N. Y. Selectron resins: Pittsburgh Plate Glass Co., Pittsburgh, Pa. Paraplex P-33: The Resinous Products and Chemical Co., Philadelphia, Pa.

TABLE III.—Properties of Laminates Made with Phenol-Formaldehyde Resins<sup>a</sup>.

Resin	Bakelite BV-17085	Plyophen 5031	Plyophen 5040	Plyophen 5015 <sup>b</sup>	Durez resin 12,704 <sup>b</sup>	Durez varnish 398 <sup>b</sup>
Tensile strength, p.s.i.	9,000	8,200	7,500	.....	.....	.....
Flexural strength, p.s.i.	13,700	13,200	11,000	11,500	16,400	9,000
Young's modulus in flexure, 10 <sup>5</sup> p.s.i.	7.3	6.2	5.5	4.2	9.4	2.8
Edgewise compressive strength, p.s.i.	9,300	15,900	12,800	11,500	23,600	7,400
Specific gravity	1.15	1.29	1.09	.....	.....	.....
Rockwell hardness	M53	M92	M41	.....	.....	.....
Water absorption, %	.....	.....	14.3	.....	.....	.....
Resin content, %	48	48	40	.....	.....	.....

<sup>a</sup> Sources of resins: Bakelite B V-17085; Bakelite Corporation, Bound Brook, New Jersey. Plyophen resins: Richhold Chemicals, Inc., Detroit, Mich. Durez resins: Durez Plastics and Chemicals, Inc., North Tonawanda, N. Y. <sup>b</sup>Values were obtained from single specimens. Results indicated trends only.

TABLE IV.—Properties of Laminates Using Thermoplastic Resins<sup>a</sup>.

	Cellulose acetate	Poly-vinyl acetate	Poly-methyl methacrylate	Poly-ethylene	Poly-vinyl butyral	Geon IIX latex
Flexural strength, p.s.i.	6,000	11,000	9,000	5,000	3,000	10,000
Young's modulus in flexure, 10 <sup>5</sup> p.s.i.	4.5	4.3	5.8	4.4	.....	6.1
Edgewise compressive strength, p.s.i.	4,000	3,800	2,000	800	15,000	9,000

<sup>a</sup> Sources of resins: Cellulose acetate sheet was dissolved in acetone and used as the impregnant. Polyvinyl acetate (Elvacet), a water emulsion containing 55% solids: E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. Polymethyl methacrylate (Eastman Kodak Co., Rochester, N. Y.) was dissolved in ethylene dichloride and used as the impregnant. Polyethylene, high molecular weight (E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.), was dissolved in hot xylene and used as the impregnant. Polyvinyl butyral, a water dispersion containing 60% solids including plasticizer: Monsanto Chemical Company, St. Louis, Mo. Geon IIX latex: B. F. Goodrich Chemical Company, Cleveland, Ohio.

a sanding disk equipped with appropriate jigs and fixtures to insure accurate test specimens. The tensile specimens were machined by means of a special cutting tool in a specially equipped drill press.

Tensile strength values were determined according to the method of A.S.T.M. D 638-46T. Specimens of Type I, under  $\frac{1}{4}$  in. thick, were used for this test with the exception that the maximum dimensions of the test panels precluded test specimens  $8\frac{1}{2}$  in. long. Accordingly, the flat section,  $2\frac{1}{2}$  in. in length, of the Type I specimens was eliminated. This procedure, besides being necessary, was in part justified inasmuch as tensile stress-strain data, which required the presence of the flat section, were not determined.

Edgewise compressive strength values were determined by the method of A.S.T.M. D 695-44T making

use of a Baldwin-Southwark compression tool in conjunction with a Dillon compression cage. Edgewise compressive strength was chosen in preference to flatwise compressive strength for the reason that the type of compression failure in conjunction with the ultimate compressive strength gave a good indication of the adhesion between individual plies. This information would not be forthcoming from flatwise compression results.

Flexural strength and Young's Modulus in flexure were determined by the procedures of A.S.T.M. D 790-45T. The flexure tool comprised two lower wedge-shaped cold rolled bearing blocks held rigidly in place with set-screws on rods which also provided variations in span length controllable to 0.010 inch.

(Please turn to page 171)

# Manufacture and Uses of AW2 Resin\*

by A. HILL

**A** VERY pale yellow, almost colorless resin, known as AW2, is manufactured by the I. G. at Ludwigshafen, Germany, by the condensation of a mixture of cyclohexanone and methyl cyclohexanone in the presence of an alkaline catalyst. There were two units for the manufacture of the resin, each with a capacity of 40 tons per month. Its application appears to be wholly in the field of coating compositions.

The condensation is carried out in an 8 cu. m. nickel-lined autoclave, fitted with a nickel agitator and a nickel steam coil (1 in Fig. 1)<sup>1</sup>. 1350 kg. of methanol are charged to the autoclave and the air is displaced by nitrogen. Four hundred kg. of potassium are added gradually and the temperature is allowed to rise to 60° C. The hydrogen in the autoclave is then displaced with nitrogen and a mixture of 1600 kg. methyl cyclohexanone and 540 kg. cyclohexanone is added. The autoclave is sealed and the temperature raised with stirring to 80° C. by means of steam in the coil. At this point an exothermic reaction sets in which raises the temperature

without further application of heat to 115° C. Steam is again applied to the coil and the temperature is held at 115 to 120° C. The heating is continued for a total period of 18 hr. from the time that the temperature reached 80° C. The pressure rises to approximately 2.5 atmospheres.

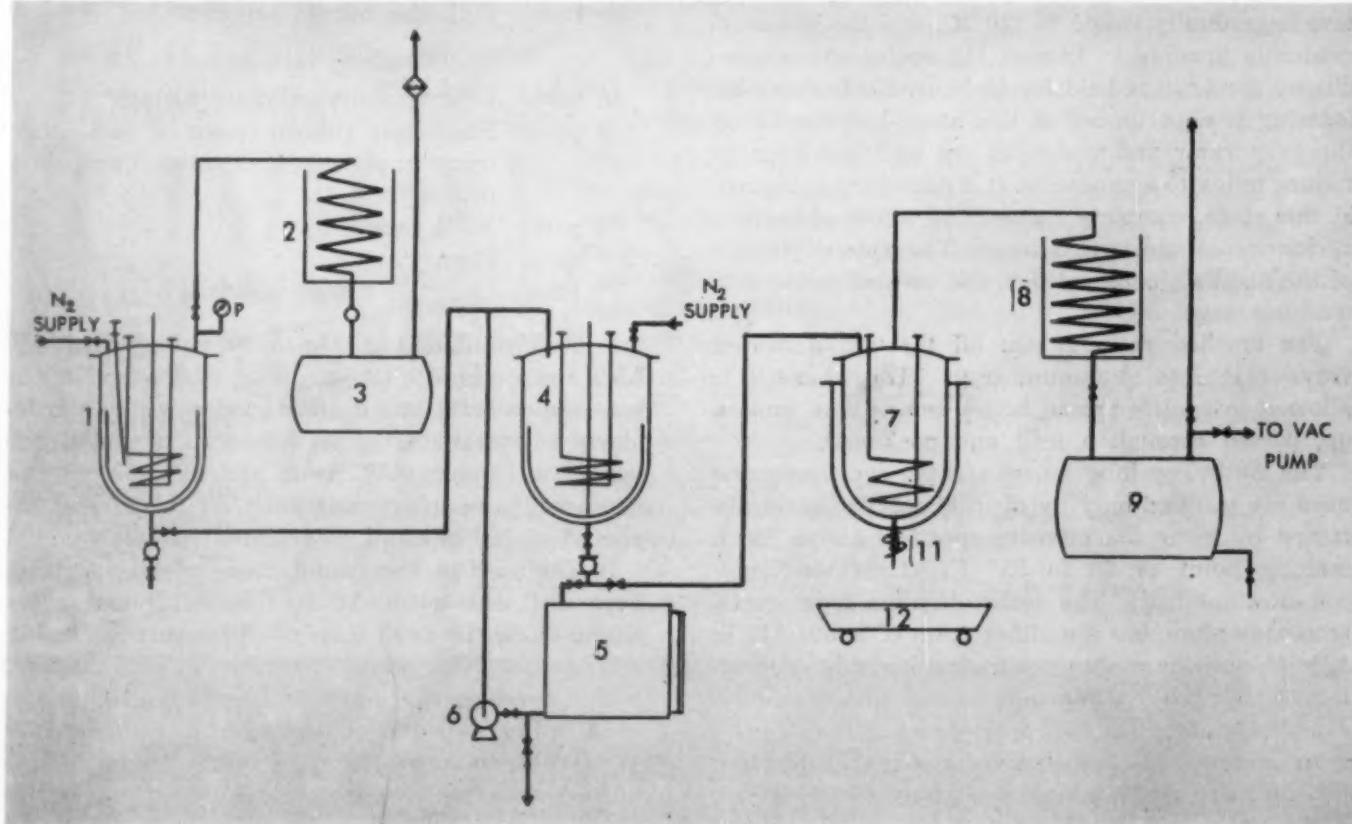
At the end of this period the pressure in the autoclave is released carefully through the condenser (2) and methanol is distilled off into 3. There is then added 1000 liters of distilled water and the remainder of the methanol in the reaction mixture is distilled off at atmospheric pressure. Distillation is continued at atmospheric pressure until the internal temperature rises to 120° C. Between 105 and 120° C. the distillate comprises a mixture of water and methyl cyclohexanol (probably a mixture of cyclohexanol and methyl cyclohexanol), the latter resulting from reduction of part of the methyl cyclohexanone charge. The methyl cyclohexanol is collected and recovered by redistillation.

The reaction mixture is cooled to 100° C. and 3800 kg. xylene are added, stirred well, and allowed to settle for 2 hours. The lower layer which comprises

\*PB 78197

<sup>1</sup>Numbers refer to the sketch of equipment shown in Fig. 1.

1 — Diagram of equipment which is used in the manufacture of AW2 resin



a solution of potassium hydroxide at approximately 33% concentration is run off. It was stated that the caustic potash solution could be used in making up the catalyst for manufacturing vinyl alkyl ethers.

In the meantime, 1000 liters water and 18 kg. sulfuric acid (calculated as 100%) are charged to the washing and neutralization vessel (4). This consists of a lead-lined vessel of 10 cu.m. capacity, heated by means of a lead covered coil and fitted with a lead covered agitator. The xylene solution of the product is then blown from 1 into 4 and the mixture stirred for  $\frac{1}{2}$  hour. After allowing to settle, the aqueous layer is run off to 5 and the xylene solution is washed twice, each time with 1 cu.m. of distilled water. It is essential that the xylene solution should be washed quite free from sulfuric acid at this stage. During each separation the small amount of emulsion at the interface is run with the water layer into 5. On longer standing in 5 a further quantity of xylene solution of resin separates and this is put into the next batch at the washing stage. During the neutralization and washing stages it is necessary to keep the temperature of the mixture above 70° C. to avoid trouble with emulsification.

After washing acid free, the xylene solution is blown to the evaporator (7). This consists of a tin-plated iron vessel fitted with tin-plated coil and jacketed. Nickel would be suitable as an alternative. This evaporator (6 cu.m. capacity) is on the small side compared with the remainder of the plant and it is necessary to add in the first place only a portion of the xylene solution of the resin. Distillation is commenced at atmospheric pressure and when the bulk of the xylene has been removed the temperature is gradually raised to 140° C. and the pressure gradually lowered to 18 mm. Hg. under which conditions the resin is held for  $\frac{1}{2}$  hour. No frothing or foaming is experienced at this stage but the lid of the evaporator and vapor lift are well insulated to reduce reflux to a minimum. It is necessary to insure, at this stage, complete removal of traces of methyl cyclohexanol and cyclohexanol. The xylene portion of the distillate is recycled to the neutralization and washing stage.

The finished resin is run off through a heated valve (11) into aluminum trays (12) where it is allowed to cool for some hours before it is broken up, passed through a mill and packaged.

The methyl cyclohexanone and the cyclohexanone used are purified only by distillation. The resin obtained by using the mixture specified above has a melting point of 90 to 95° C. (Craemer-Nagel-Saranow method). The resin obtained from cyclohexanone alone has a melting point of about 115 to 120° C. and the melting point can be reduced from this as desired by varying the amount of methyl cyclohexanone.

In order to obtain a good color it is essential that all the materials used be free from contamination with iron and that such contamination should not

arise at any stage in the process from the plant itself. Furthermore, if any traces of sulfuric acid are left in the xylene solution before evaporation, the resin becomes brown and is useless.

The yield is about 1700 to 1750 kg. of resin, i.e., about 81% of the weight of ketones charged. There is a recovery of approximately 20% of methyl cyclohexanol.

Its good solubility in a variety of solvents, good compatibility with a wide range of other film-forming materials, pale color, and freedom from yellowing rendered this product of considerable interest in a variety of uses.

Probably the widest applications were in the cellulose nitrate lacquer field, where it was stated to confer good adhesion to metals, especially light alloy metals, and to wood, and to confer very good weathering properties. When applied in cellulose nitrate lacquers to metal surfaces, it can be used in the formulation of polishing lacquers. It was not recommended for polishing lacquers to be applied to wood surfaces because the usual wood polishes contain paraffinic hydrocarbons which tend to dissolve the AW2 resin and cause blooming of the film; urea resins were preferred to AW2 resin in polishing lacquers for wood.

Typical formulations for cellulose nitrate lacquers for application to metals were as follows:

*Primer:*

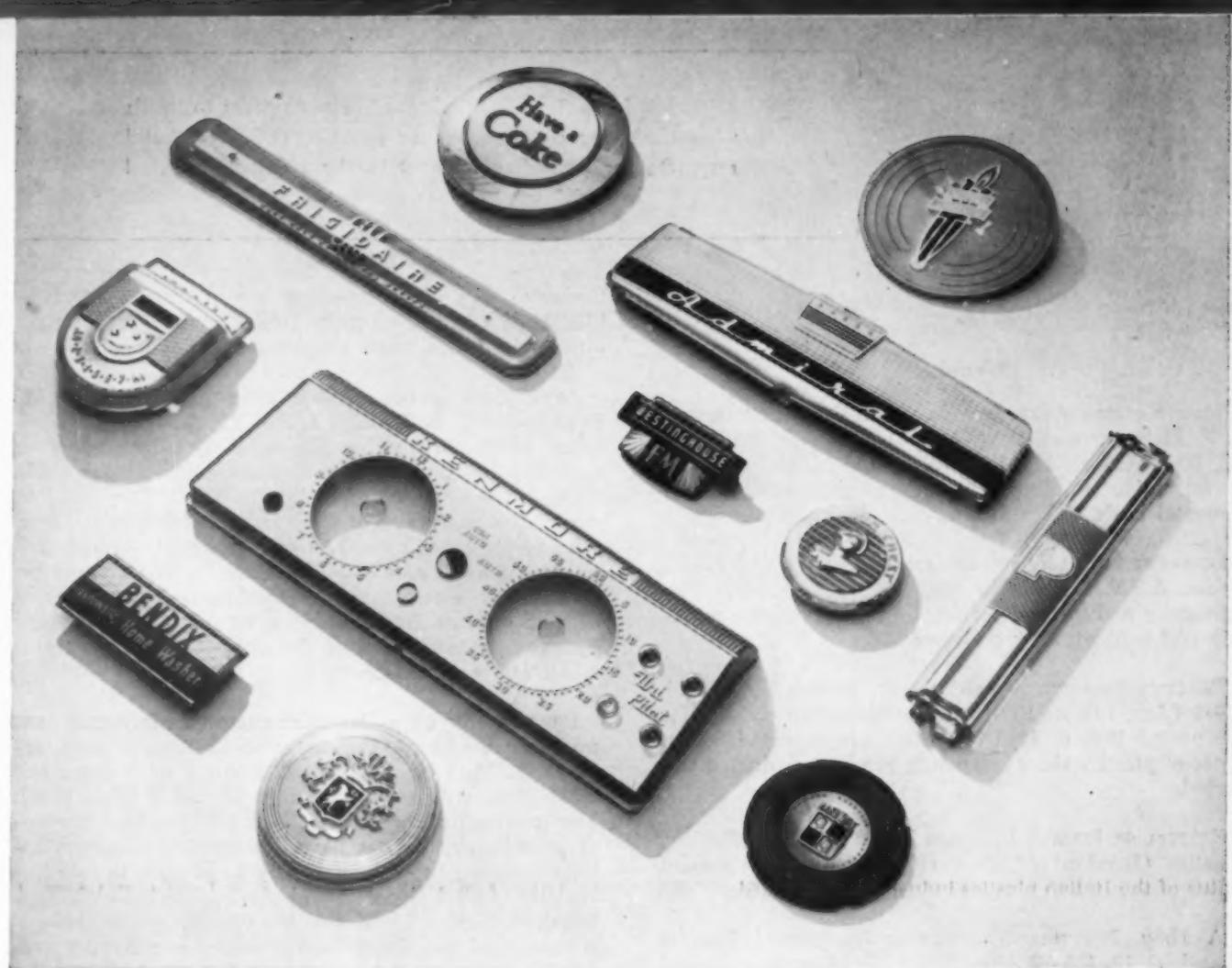
9 parts	High viscosity cellulose nitrate
7-9 parts	Tricresyl phosphate or dibutyl phthalate
5-6 parts	AW2 resin
6 parts	Iron oxide
Plus	Cellulose nitrate solvents

*Finishing lacquer:*

16 parts	Low viscosity cellulose nitrate
9 parts	Plasticizer (blown castor oil and either tricresyl phosphate or dibutyl phthalate in ratio of 1:1)
5 parts	AW2 resin
5-9 parts	Pigment
Plus	Cellulose nitrate solvents

In the formulation of chlorinated rubber lacquers, AW2 resin was of interest, owing to the fact that it is nonsaponifiable and confers good adhesion, particularly on metals. A typical formulation would contain 20 to 30 parts AW2 resin and 50 to 60 parts of nonsaponifiable plasticizer such as chlorinated diphenyl to 100 parts of chlorinated rubber.

It was used in the manufacture of oil varnishes because it does not make the film brittle and larger amounts can be used than of other varnish resins, such as the KM resins, Albertols, ester gum, etc., and its use helped to conserve linseed oil. It was also used in linseed stand oil varnishes to the extent of 10 to 20% on the stand oil. It was claimed that in linseed-wood oil varnishes, it gave good outside resistance, good gloss, and good adhesion.



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# PLASTICS DIGEST\*

Abstracts from the world's literature of interest to those who make or use plastics or plastics products. Send requests for periodicals direct to the publishers listed

## General

**SOME FACTORS AFFECTING ADHESIVE BOND FORMATION.** H. P. Meissner and E. W. Merrill. *A.S.T.M. Bull.* No. 151, 80-83 (Mar. 1948). Some of the factors affecting the formation of adhesive bonds are explained on a fundamental basis.

**LOW-PRESSURE MOLDINGS AND LAMINATES.** T. W. Noble. *A.S.T.M. Bull.* No. 151, 77-79 (Mar. 1948). The properties and methods of forming low-pressure moldings and laminates are reviewed.

**PLASTICS PRODUCTION IN BRITAIN.** British Plastics 20, 146-9 (Apr. 1948). Production statistics for plastics for the period 1941 to 1946 in Britain are reported. Most types of plastics show increasing production during this period.

**REVIVAL OF ITALIAN PLASTICS INDUSTRY.** H. J. Becker. *Plastics (London)* 12, 76-7 (Feb. 1948). The present status of the Italian plastics industry is discussed.

**A NEW PLASTICS FABRICATING INDUSTRY.** *Plastics (London)* 12, 169-72 (Apr. 1948). Polyethylene is used in the production of bottles, pipe, laboratory apparatus, and other containers where resistance to chemicals is necessary.

## Materials

**ELASTIC N-SUBSTITUTED POLYAMIDES.** E. L. Wittbecker, R. C. Houtz and W. W. Watkins. *Ind. Eng. Chem.* 40, 875-9 (May 1948). Elastic N-substituted polyamides were obtained as a result of an investigation of N-substitution and a study of the effect of chemical structure on a number of physical properties, especially those important to a textile fiber. The size, nature, distribution, and amount of substituents can be controlled to produce polymers varying from the hard, tough, high-melting unsubstituted polyamides to soft, tacky, low-melting 100% N-substituted polyamides. Intermediate in properties are the fibers and films possessing long range elasticity.

**VINYL AND ALLYL CROTONATES.** *Plastics (London)* 12, 82-4 (Feb. 1948). Resins made from vinyl and allyl crotonates and their copolymers with styrene, vinyl acetate and diethylene glycol maleate are described. The syntheses are given in detail. Eleven references.

**$\alpha$ -METHYLSTYRENES AND THE STERIC HINDRANCE OF ORTHO-SUBSTITUENTS.** G. B. Bachman and R. W. Finholt. *J. Am. Chem. Soc.* 70, 622-4 (Feb. 1948). The copolymerizations of 11 different nuclearly substituted  $\alpha$ -methylstyrenes with butadiene were studied. The effects of the natures and positions of the substituents on

the rates of copolymerization are discussed and the hindrance of ortho substituents is indicated. Six new  $\alpha$ -methylstyrenes were prepared and characterized.

**ARYL CARBAMATES OF CELLULOSE ACETATE.** W. M. Hearon and J. L. Lobsitz. *J. Am. Chem. Soc.* 70, 296-7 (Jan. 1948). Phenyl, o-chlorophenyl, p-bromophenyl, o-tolyl, p-tolyl, and  $\alpha$ -naphthyl isocyanates react readily with 38.8% cellulose acetate at 60° C. The order of relative reaction rates of these isocyanates is as follows: p-bromophenyl (fastest), o-chlorophenyl,  $\alpha$ -naphthyl, phenyl, p-tolyl, and o-tolyl (slowest). The completely carbamated esters show good solubilities in a variety of organic solvents. All cellulose acetate carbamates formed hydrolyze partially during de-acetylation with aqueous alkali at room temperature.

**PREPARATION OF  $\alpha$ -CARBALKOXYALKYL METHACRYLATES BY PYROLYSIS OF THE CORRESPONDING  $\alpha$ -ACETOXYISOBUTYRATES.** E. M. Filachione, M. L. Fein, J. H. Lengel and C. H. Fisher. *J. Am. Chem. Soc.* 70, 526-9 (Feb. 1948). The method of producing  $\alpha$ -carbalkoxyalkyl methacrylates by pyrolysis of the corresponding  $\alpha$ -acetoxyisobutyrate was used satisfactorily to prepare the methacrylates of allyl glycolate and of allyl, methallyl, benzyl, tetrahydrofurfuryl and  $\beta$ -chloroethoxyethyl lactates. It is concluded that the pyrolytic method is generally useful for making  $\alpha$ -carbalkoxyalkyl methacrylates. The methacrylates polymerized readily when heated in the presence of benzoyl peroxide. The polymeric methacrylate of  $\beta$ -chloroethoxyethyl lactate was amber and flexible, the allyl and methallyl polymers were hard, colorless, insoluble and infusible and the benzyl and tetrahydrofurfuryl polymers were hard and colorless.

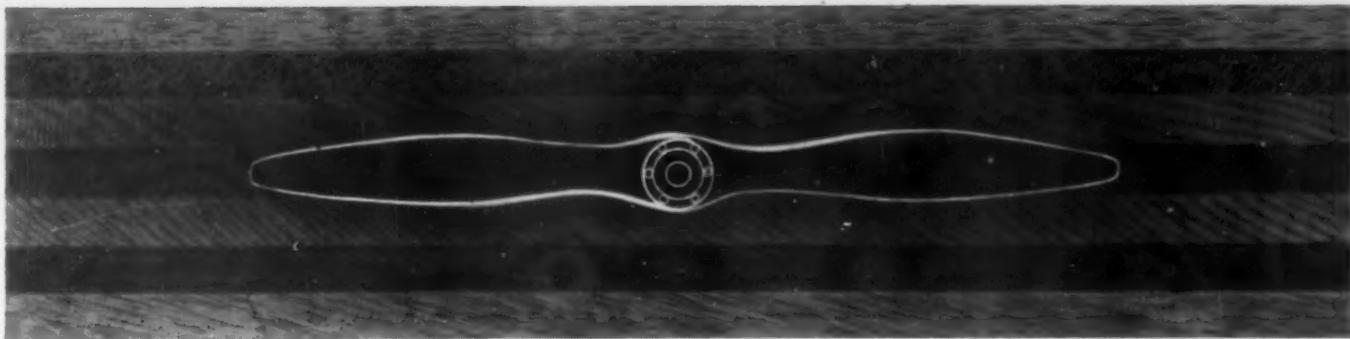
**PLASTICIZATION OF THERMOPLASTICS WITH SPECIAL REFERENCE TO STABILITY.** E. E. Halls. *Plastics (London)* 11, 594-8, 645-50 (Nov., Dec. 1947). The effects of plasticizers on the properties of plastics in which they are a constituent are reviewed. The properties and applications of plasticizers for cellulose acetate and cellulose butyrate are discussed.

**VULCANIZED FIBRE IS STRONG, TOUGH, HARD AND EASY TO WORK.** G. A. Albert. *Materials & Methods* 27, 88-92 (Apr. 1948). The grades, properties, forming, machining, fabricating, and applications of vulcanized fibre are described. Laminates, medical equipment parts, milk processing equipment parts, toys, nuts, gears, abrasive disks, electrical machining parts, cases, rail insulators, heel lifts, and textile machinery parts are made from this material.

## Chemistry

**THIOPHENE-FORMALDEHYDE CONDENSATION.** P. D. Caesar and A. N. Sachanen. *Ind. Eng. Chem.* 40, 922-8 (May 1948). Thiophene was condensed with formaldehyde under mildly acidic conditions to form heat-reversible and irreversible resins. Bases will not catalyze the reaction. Yet thiophene-phenol co-condensa-

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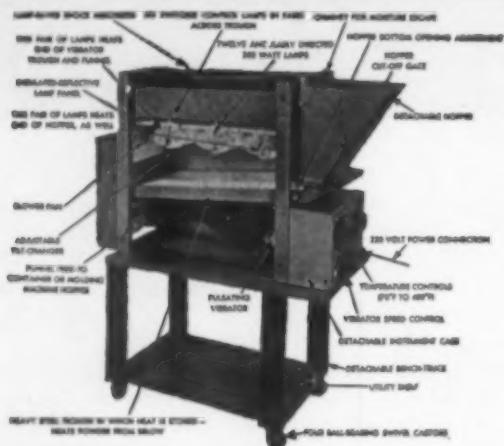
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MODERN PLASTICS

tion products with formaldehyde, containing up to 60 parts of thiophene to 40 parts of phenol, will thermoset at an alkaline pH in the presence of hexamethylene-tetramine. A mechanism for the condensation of thiophene and phenol with formaldehyde is proposed, based on the analogous reactivity of their rings.

## Testing

USE OF ROSSI-PEAKES FLOW TESTER IN MEASURING THE APPARENT VISCOSITY OF PLASTICS AT TEMPERATURES FROM 115 TO 175° C. F. E. Piech and W. E. Gloor. A.S.T.M. Bull. No. 151, 70-75 (Mar. 1948). The Rossi-Peakes flow tester called for by A.S.T.M. Tentative Method D 569 was operated as a plastometer by pre-heating the flow pellet in the heating cylinder for 3 min. before releasing the flow. Apparent viscosities were calculated for ethyl cellulose and cellulose acetate plastics over a range of temperatures and pressures. Both plastics are pressure-sensitive, and in addition, ethyl cellulose does not follow the normal linear relation between the square of the flow distance and time of flow. With cellulose acetate plastics about half of this pressure sensitivity of viscosity can be explained by delayed elastic displacement of the plastic during the test; ethyl cellulose plastic showed less elastic deformation, but somewhat more pressure sensitivity. In the A.S.T.M. flow test D569, about 40 of the 120-sec. test time is spent in heating the plastic pellet to the test temperature, and about 20% of the observed flow in cellulose acetate is due to elastic deformation of the sample. With these corrections, the apparent viscosity of a cellulose acetate plastic at the A.S.T.M. flow temperature is about 10<sup>7</sup> poises.

MEASUREMENT OF VOLUME RESISTIVITY OF ELECTRICALLY CONDUCTING RUBBER-LIKE MATERIAL. R. F. Miller. A.S.T.M. Bull. 1948, No. 151, 91-95 (Mar. 1948). Electrically conducting rubber-like materials are being used in many applications where the poor conductivity of ordinary rubber compounds or other materials allows dangerous static voltages to exist. A few of these uses are: hospital operating room flooring, anesthesia masks and tubing, tires, belts, de-icers, self-sealing fuel cells, and heels and soles for shoes. Frequently these applications require materials having resistivities below  $10^8$  ohm-cm. Early attempts to make control measurements of these materials were frequently inconsistent because of equipment or technique. The measuring equipment described was designed to eliminate errors arising from contact resistance and high power density. The effects of voltage gradient, contact pressure, and some of the effects previously attributed to mill grain are thought to be a part of the contact resistance problem. Errors due to contact resistance are eliminated by the use of separate current and voltage electrodes. Two circuits using this electrode system are described: one for direct current measurements and the other for alternating current measurements. The specific impedance (impedance in ohm-cm.) of conducting rubber at 60 cycles per sec. is shown to be the same as the d-c. resistivity from 1 ohm-cm. to  $10^8$  ohm-cm. The measuring technique is also considered as a source of errors from flexing, relative humidity, and temperature.

## Properties

TENSILE STRESS-STRAIN RELATIONSHIPS OF LAMINATED PLASTICS FOR SMALL STRAINS. J. J. Lamb and B. M. Axilrod. A.S.T.M. Bull. No. 151, 59-66 (Mar. 1948). Tensile stress-strain data were taken on six represen-



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tative plastic laminates using the Tuckerman strain gage for the first 0.5% strain. The materials investigated were a glass-fabric polyester laminate and asbestos-fabric, high-strength-paper, and cotton-fabric phenolic laminates. A parabolic equation was found to fit the stress-strain data at small strains better than a linear relationship. The initial modulus of elasticity determined by the parabolic equation was 2 to 8% greater than the modulus obtained by the linear equation. The use of the proportional limit is to be avoided since the determination of this quantity is affected by the precision of the equipment, the method of analyzing the data, and other variables. The use of secant moduli of elasticity for one or more stress ranges or strain ranges is recommended rather than attempting to obtain the initial modulus of elasticity.

**PLASTICS AS OPTICAL MATERIALS.** H. R. Moulton. A.S.T.M. Bull. No. 151, 75-77 (Mar. 1948). The optical properties of plastics and the methods of forming these materials are reviewed.

**TEMPERATURE DEPENDENCE OF THE ADHESION OF HIGH POLYMERS TO CELLULOSE.** C. H. Hofrichter, Jr. and A. D. McLaren. Ind. Eng. Chem. 40, 329-31 (Feb. 1948). By mixing a vinyl chloride-vinyl acetate polymer with a second polymer in which a portion of the vinyl acetate was replaced by maleic acid, it was possible to vary the concentration of the carboxyl group through a wide range. Experiments showed that adhesion to regenerated cellulose, which was assumed to be a measure of the carboxyl-hydroxyl dipole-dipole bonds formed, increases in a manner expressible by "adhesion is equal to a constant times the concentration of carboxyl raised to a power", reminiscent of the Freundlich sorption isotherm. At any given carboxyl concentration adhesion increases with temperature. This result can be explained by a high endothermic activation energy for viscous flow in combination with a smaller exothermic heat of sorption. The former energy is a measure of the process of the chain segment motion which is necessary to permit more dipoles within the polymer to approach the vicinity of the active centers in the substrate.

### Synthetic rubber

**SUBSTITUTED VINYL PYRIDINES AS MONOMERS FOR SYNTHETIC ELASTOMERS.** R. L. Frank, C. E. Adamas, J. R. Blegen, P. V. Smith, A. E. Juve, C. H. Schroeder, and M. M. Goff. Ind. Eng. Chem. 40, 879-82 (May 1948). Copolymers of dienes with substituted vinylpyridines have some promise as synthetic elastomers. Methods of preparation and the copolymerization with butadiene and isoprene of a number of variously substituted vinylpyridines are described. Vulcanizates of the copolymers have a high modulus and high tensile strength as compared with GR-S and their flexing-hysteresis balance is for the most part superior to that of GR-S, although the hysteresis temperature rise is generally higher.

### Applications

**FIVE CASE STUDIES OF PHENOLICS AT WORK.** E. F. Boro. Electrical Manuf. 41 114-18 (May 1948). The design and performance of five electrical parts molded of phenolic plastics are described.

**NUMBER WHEELS AND PINIONS OF POLYSTYRENE.** Plastics (London) 12, 188-9 (Apr. 1948). Number wheels and pinions for use in electric, gas, and water meters are made of polystyrene.

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# U. S. PLASTICS PATENTS

Copies of these patents are available from the U. S.  
Patent Office, Washington, D. C., at 25 cents each

**INSULATION.** A. J. Warner (to Federal Telephone and Radio Corp.). U. S. 2,436,842, Mar. 2. Electrical insulator containing polyethylene or the like, cyclized rubber, and polystyrene.

**MOLDING.** N. Lester (to Lester Engineering Co.). U. S. 2,436,869, Mar. 2. A combination of an injection cylinder and spreader in an injection molding device.

**POLYMERIZATION.** R. A. Jacobson (to E. I. du Pont de Nemours & Co., Inc.). U. S. 2,436,926, Mar. 2. Process for polymerizing acrylonitrile or mixture thereof with a similar vinyl compound to give a dimethyl formamide-soluble polymer.

**MOLDING.** J. R. Fisher, Jr. (to H-P-M Development Corp.). U. S. 2,436,993, Mar. 2. An apparatus for molding plastic material.

**MOLDING.** H. F. MacMillin, W. Ernst, and G. A. Walldie (to H-P-M Development Corp.). U. S. 2,436,999, Mar. 2. An apparatus for heating and injection molding plastic material.

**POLYESTERS.** D. A. Rothrock, Jr. and R. F. Coyne (to Resinous Products and Chemical Co.). U. S. 2,437,046 and 2,437,232, Mar. 2. Linear polyesters are stabilized by polymerizing in the presence of a phosphorus compound.

**SILICON POLYMERS.** R. R. McGregor and E. L. Warrick (to Corning Glass Works). U. S. 2,437,204, Mar. 2. A dehydrated liquid polymeric diorganosiloxane is polymerized by heating with sulfuric acid.

**COPOLYMERS.** D. T. Mowry (to Monsanto Chemical Co.). U. S. 2,437,231, Mar. 2. Polymerization of a mixture of styrene and a  $\beta$ -cyanoacrylate.

**CONDENSATION PRODUCT.** L. L. Lerner (to Consolidated Royal Chemical Corp.). U. S. 2,437,261, Mar. 9. Polyethylene glycol and a cholesteryl ester of a saturated straight chain monocarboxylic acid are condensed.

**INDENE POLYMER.** F. J. Soddy (to United Gas Improvement Co.). U. S. 2,437,278, Mar. 9. Methyl indene is polymerized with a catalyst such as an alkyl or aryl sulfate.

**ARTIFICIAL RUBBER.** B. W. Watson. U. S. 2,437,284, Mar. 9. A resilient rubber substitute prepared by forming a phenol-aldehyde resin in the presence of a plasticizer and mixing with a polyvinyl resin.

**EMULSIONS.** W. H. Butler (to Bakelite Corp.). U. S. 2,437,293, Mar. 9. An aqueous emulsion comprising a copolymerizate of a drying oil with an ester obtained by

reacting a cyclopentadiene-maleic adduct, a fatty acid, and a polyhydric alcohol.

**COPOLYMERS.** G. F. D'Alelio (to Pro-phy-lac-tic Brush Co.). U. S. 2,437,420-1, Mar. 9. Vulcanizable copolymers of a vinyl-aryl compound or acrylonitrile with butadiene and vinyl ethers.

**CONTACT LENSES.** J. E. Mullen. U. S. 2,437,436, Mar. 9. Methods of machining, polishing, and performing other operations on a plastic contact lens.

**COPOLYMERS.** G. F. D'Alelio (to General Electric Co.). U. S. 2,437,508, Mar. 9. Copolymers of mixtures comprising allyl and methallyl ether esters.

**RESIN.** H. J. West and H. M. Enterline (to American Cyanamid Co.). U. S. 2,437,657, Mar. 9. A resinous butylated urea-formaldehyde condensate plasticized with a resinous reaction product of phthalic acid, glycerol, and 2-ethyl hexoic acid.

**RESINS.** P. H. Rhodes (to Koppers Co., Inc.). U. S. 2,437,710, Mar. 16. Producing a homogeneous resin mass by refluxing a molten mass of methylol monohydric phenol and a polyhydric phenol.

**RESIN COATING.** N. R. Yorke (to St. Regis Paper Co.). U. S. 2,437,799, Mar. 16. A laminate having a craze resistant pigmented surface formed by applying to a foundation a glass-fibre-containing sheet coated with thermosetting resin and curing.

**COATING.** C. D. Evans and R. H. Manley (to U. S.). U. S. 2,437,946, Mar. 16. A coating composition containing prolamine plasticized with N-butyl lactamide.

**MOLDING COMPOUND.** H. I. Hersh (to Owens-Illinois Glass Co.). U. S. 2,437,955, Mar. 16. Furfuryl alcohol mixed with maleic, fumaric, or oxalic acid is mixed with lignin material and the mixture is polymerized.

**COPOLYMER.** E. L. Kropa (to American Cyanamid Co.). U. S. 2,437,962, Mar. 16. A copolymerizable mixture of a polyester of allyl alcohol and a polybasic acid and a polyester of a saturated monohydric alcohol and an  $\alpha$ ,  $\beta$ -unsaturated polycarboxylic acid.

**INTERPOLYMER.** D. T. Mowry (to Monsanto Chemical Co.). U. S. 2,437,966, Mar. 16. An interpolymer of styrene and fumaronitrile mixed with an alkyl phthalyl alkyl glycolate.

**COPOLYMER.** R. B. Seymour and D. T. Mowry (to Monsanto Chemical Co.). U. S. 2,437,980, Mar. 16. Emulsifying a chlorobenzalacetone mixture with a butadiene-1,3 derivative in aqueous medium.

**PHENOLIC ADHESIVE.** J. T. Stephan, R. A. Jarvi, and J. R. Ash (to Monsanto Chemical Co.). U. S. 2,437,981, Mar. 16. A water-soluble phenolic adhesive for hot-

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**THERMOSETTING COMPOSITION.** T. H. Rogers, Jr. and R. D. Vickers (to Wingfoot Corp.). U. S. 2,438,097, Mar. 16. A thermoset composition prepared by incorporating a quaternary ammonium compound with a vinyl chloride-vinylidene chloride copolymer and heating.

**VINYL HALIDE RESIN.** F. W. Cox and J. M. Wallace (to Wingfoot Corp.). U. S. 2,438,102, Mar. 16. Color stabilizing vinyl halide copolymerized with another vinyl compound by dispersing therein magnesium salicylate or an alkaline earth salicylate.

**BUILDING CONSTRUCTION.** C. I. Auten (to Tenn. Coal, Iron, and Railroad Co.). U. S. 2,438,140, Mar. 23. A combination of plastic panels with metallic joining devices for building construction.

**PRESSURE-SENSITIVE TAPE.** H. J. Tierney (to Minnesota Mining and Manufacturing Co.). U. S. 2,438,195, Mar. 23. A pressure sensitive tape having a fibrous backing impregnated with a non-tacky polyacrylate elastomer and a pressure sensitive layer.

**POLYMERIZATION.** H. L. Johnson (to Sun Oil Co.). U. S. 2,438,340, Mar. 23. Polymerizing a mixture of isobutylene, butadiene, and styrene at -40° C. in the presence of aluminum bromide in solution in a hydrocarbon.

**SILICONES.** J. F. Hyde (to Corning Glass Works). U. S. 2,438,478, Mar. 23. A polymer of dimethyl silicone.

**POLYMER PURIFICATION.** G. W. Stanton (to Dow Chemical Co.). U. S. 2,438,480, Mar. 23. Peroxide catalysts in alcohol-insoluble polyvinyl halides are destroyed by heating in amyl alcohol solution.

**TUBE FORMING.** S. R. Geist, Sr. and N. R. Davis (to Gemloid Corp.). U. S. 2,438,498, Mar. 30. Device for sealing plastic material with high frequency current to produce plastic tubing.

**INSULATION.** A. A. New (to International Standard Electric Corp.). U. S. 2,438,516, Mar. 30. A solid insulating mixture of polystyrene and 2,2'-ditolyl.

**SILICON POLYMERS.** N. P. Robie and F. E. Sheibley (to Carborundum Co.). U. S. 2,438,520, Mar. 30. A polymer formed by reacting a silicon tetrahalide with an unsaturated aliphatic monohydroxy alcohol.

**UTENSIL.** J. Davis (to Joseph Davis Plastics Co.). U. S. 2,438,546, Mar. 30. A dish for maintaining food at constant temperature formed by molding interfitting shells of thermoplastic material.

**COPOLYMER.** C. A. Mackenzie and J. B. Rust (to Montclair Research Corp. and Ellis-Foster Co.). U. S. 2,438,612, Mar. 30. A copolymer of tetraallylsilane and methyl methacrylate, butyl methacrylate, or vinyl acetate.

**JOINING MEANS.** D. E. Stevens (to Hammond Aircraft Co.). U. S. 2,438,685, Mar. 30. Method of joining thermoplastic material by engaging surfaces and fusing together. (Please turn to next page)

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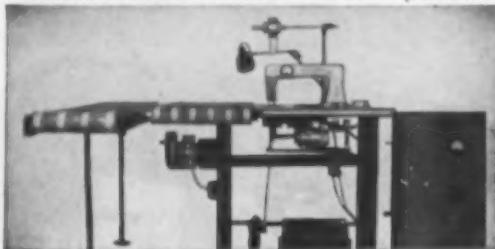
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TOY BALLOONS. J. G. Jakobsen (to Niels B. Bach). U. S. 2,438,854, Mar. 30. Toy balloons formed by blowing a mixture of polyvinyl acetate dissolved in a volatile solvent.

MOLDING. E. R. Knowles. U. S. 2,438,856-7, Mar. 30. Plastic molding apparatus.

FORMAL POLYMERS. W. F. Greshan (to E. I. du Pont de Nemours & Co., Inc.). U. S. 2,438,909, Apr. 6. Polymerizes of an alkyl hydroxy-alkyl formal in the presence of an acid catalyst.

INSULATION. T. R. Scott and A. A. New (to Standard Telephones and Cables, Ltd.). U. S. 2,438,949, Apr. 6. An insulating composition of plasticized polyvinyl chloride and a solid organic polysulfide.

CEMENT. H. C. Thuline, W. F. Parsons, and G. P. Waugh (to Eastman Kodak Co.). U. S. 2,438,953, Apr. 6. A lens cement of poly-alpha-methacrylate and an ester of a polyhydric alcohol and hydrogenated abietic acid.

CABLE. A. J. Warner (to Federal Telephone and Radio Corp.). U. S. 2,438,956, Apr. 6. A high frequency cable comprising a stranded core whose interstices are filled with a soft low molecular weight plasticized polystyrene and a surrounding sheath of high molecular weight polystyrene.

TEXTILE FILAMENTS. T. A. Field, Jr., E. W. Rugeley, and J. L. Petrokubi (to Carbide and Carbon Chemicals Corp.). U. S. 2,438,968, Apr. 6. Process for producing yarns by coating vinyl copolymers with a water soluble incompatible polymeric substance.

ALKYL CELLULOSE. J. E. Jones (to Celanese Corp. of America). U. S. 2,438,975, Apr. 6. An alkyl cellulose stabilized with an N-alkylated diamine.

SHEET MATERIAL. J. H. McGill (to Imperial Chemical Industries, Ltd.). U. S. 2,439,051, Apr. 6. Fabrics upon which are calendered a composition of polyvinyl chloride followed by a solution of polymethacrylic ester having polyvinyl chloride dispersed therein.

COPOLYMER. C. C. Clark (to Mathieson Alkali Works, Inc.). U. S. 2,439,076, Apr. 6. A rubber-like copolymer of dichlorostyrene, butadiene-1,3 and piperylene.

POLYMER. J. B. Dickey and F. C. Duennebier (to Eastman Kodak Co.). U. S. 2,439,081, Apr. 6. A polymer of a beta-cyano-acrylic acid amide, trans form.

THERMOPLASTIC. L. W. A. Meyer (to Eastman Kodak Co.). U. S. 2,439,093, Apr. 6. A composite of cellulose acetate butyrate plasticized with an alkyl abietate or a hydrogenated alkyl abietate.

MELT-COATING. M. Salo and H. F. Vivian (to Eastman Kodak Co.). U. S. 2,439,103, Apr. 6. A cellulose web having a melt coating of cellulose acetate butyrate and di-2-ethyl hexyl sebacate.

COATING. H. C. Staehle (to Eastman Kodak Co.). U. S. 2,439,108, Apr. 6. Coatings of hydrolyzed polyvinyl esters containing a water-soluble boron compound are applied and fumed with a nitrogen base such as ammonia and dried. (Please turn to next page)

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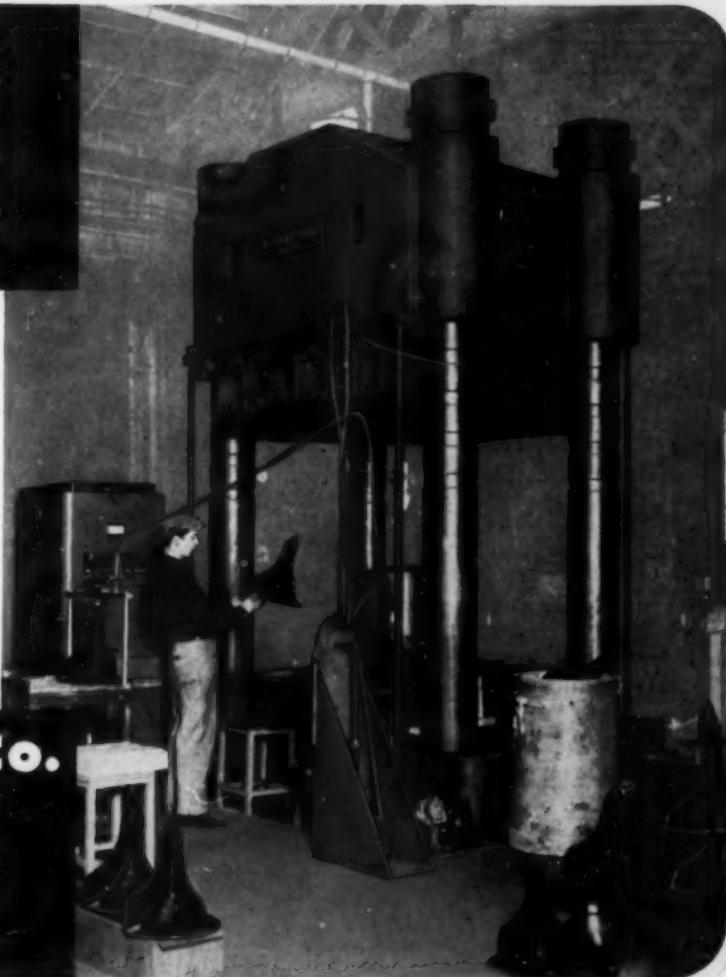
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**LAMINATE.** A. V. Keller (to Thompson's Ltd.). U. S. 2,439,137, Apr. 6. A molded article comprising layers of resin impregnated fibrous material containing varying resin contents, and layers of metal sheet, said article having high heat conductivity on one surface and low heat conductivity on the other.

**COPOLYMER.** L. E. Daly (to U. S. Rubber Co.). U. S. 2,439,202, Apr. 6. A homogeneous mixture of butadiene-1,3-acrylonitrile copolymer and a copolymer of styrene and acrylonitrile.

**COPOLYMER.** J. P. Kispersky and R. B. Seymour (to Monsanto Chemical Co.). U. S. 2,439,213, Apr. 6. An interpolymer of para-chloro-alpha-methylstyrene and styrene.

**COPOLYMER.** R. V. Lindsey, Jr. (to E. I. du Pont de Nemours & Co., Inc.). U. S. 2,439,214, Apr. 6. An interpolymer of an alkene phosphonic dialkyl, diaryl, or tetraalkylamide ester and acrylic or vinyl monomer.

**COPOLYMER.** R. B. Seymour (to Monsanto Chemical Co.). U. S. 2,439,226, Apr. 6. An interpolymer of fumarodinitrile with an alpha substituted styrene.

**INTERPOLYMERS.** R. B. Seymour and J. P. Kispersky (to Monsanto Chemical Co.). U. S. 2,439,227, Apr. 6. An interpolymer of styrene, maleic anhydride, and acrylonitrile.

**CHAIR.** H. V. Thaden (to Thaden Jordan Furniture Corp.). U. S. 2,439,322, Apr. 6. A plywood chair.

**COPOLYMER.** E. L. Kropa (to American Cyanamid Co.). U. S. 2,439,343, Apr. 6. A liquid copolymer of beta-myrcene and p-methylstyrene.

**TUBE FITTING.** G. B. Thayer and R. D. Lowry (to Dow Chemical Co.). U. S. 2,439,351, Apr. 6. A plastic fitting for flexible plastic tubing.

**ADHESIVE.** W. H. Nicol (to Wingfoot Corp.). U. S. 2,439,369, Apr. 6. An adhesive comprising a condensation product of rubber and an organic diisocyanate.

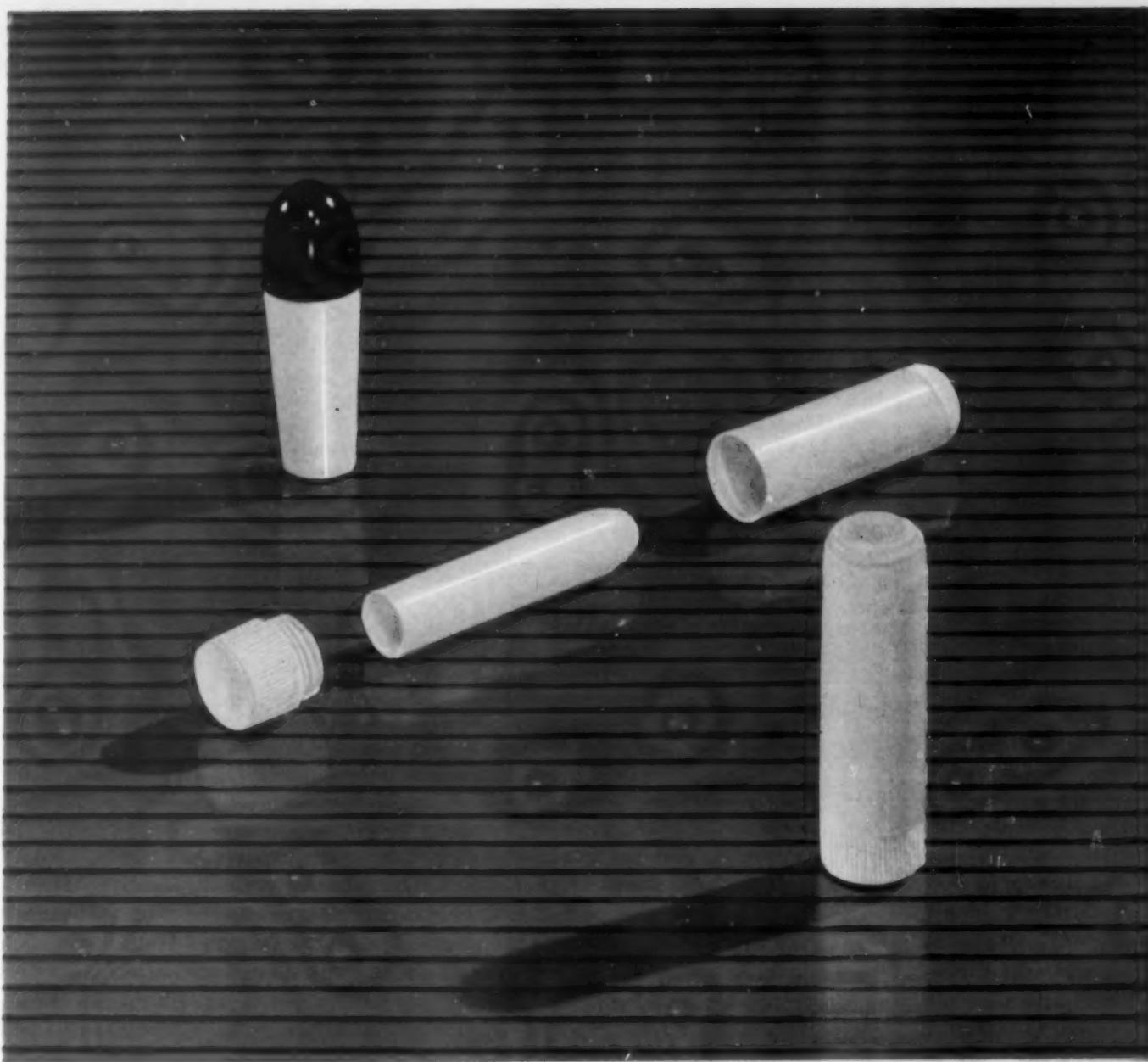
**METHYL METHACRYLATE.** S. A. Leader and J. J. Gordon (to Portland Plastics Ltd.). U. S. 2,439,374, Apr. 13. Methyl methacrylate is rendered opaque to X-rays by incorporating therein ethylene dibromide.

**TALL OIL.** M. K. Bare and W. Stubblebine (to Armstrong Cork Co.). U. S. 2,439,377, Apr. 13. A siccative oil-resin-tall oil gel formed by mechanically oxidizing the ingredients.

**COATING.** M. Leatherman. U. S. 2,439,395-6, Apr. 13. Rot- and fire-resistant fabric coating comprising vinyl chloride-acetate copolymer, butyl methacrylate polymer, tricresyl phosphate, zinc carbonate, pentachlorophenol, pigment and solvent vehicle.

**OLEFIN POLYMERS.** M. J. Roedel (to E. I. du Pont de Nemours & Co., Inc.). U. S. 2,439,528, Apr. 13. Olefins are polymerized at a pressure above 4 atm. and at 60 to 400° C. in the presence of an azine catalyst.

**FUEL TANK.** M. M. Cunningham (to U. S. Rubber Co.). U. S. 2,439,562, Apr. 13. A self-sealing fuel tank having fabric layers, puncture sealing interlayers, and a layer of resin-impregnated glass cloth.



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**Gage**—Thicknesses of plastic films may be determined to an accuracy of 0.00001 in. with a new gage developed by the Goodyear Research Laboratory, Goodyear Tire and Rubber Co., Akron, Ohio. The gage makes use of a radioactive isotope known as Carbon 14. According to Dr. W. E. Morris, research physicist who developed the device, it is expected to attain an accuracy of a millionth of an inch. Sheets may be measured continuously as they come from the rolls and no mechanical contact with the film is required. The film is simply passed through a slot in the gage. Below the slot is a bit of Carbon 14; above the slot is an ionization-chamber in which a minute electrical current is produced by the Carbon 14 rays. No elaborate shielding is required as Carbon 14 is among weakest of the radioactive isotopes.

**Die filer**—A variable speed precision die filer, Model 1500-S, has been announced by the DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill. It is manufactured for the company by the All American Tool & Mfg. Co., Chicago, Ill. Stepless speeds from 170 to 470 strokes per min. are made possible through the use of a DoAll Speedmaster, Model 3A.

Files for the die filer are available in 12 different shapes, three grades of coarseness and two shank sizes, with corresponding cross-section sizes. Honing stones and diamond hones are also available for finishing work. Features of the filer include a two-power magnifier equipped with twin lamps; a universal-joint file clamp, vertical slide bearings, and a screw-operated tilting table 10 $\frac{3}{8}$  in. square.

**Riveter**—Lemert Engineering Co., Plymouth, Ind., has introduced the Airflex pneumatic riveter which operates on the rotating impact principle and is said to permit riveting in plastics without damage to the work pieces. This principle combines a straight-line pneumatic hammer blow for controlled precision with an electric motor-rotated peen for synchronized distribution of the impacts on the rivet head. The peen delivers 7000 to 10,000 blows per minute. Hammer units are interchangeable and 12 models of the riveter are available.

**High speed drills**—For internal carving in acrylic, Foredom Electric Co., 27 Park Place, New York 7, N. Y., has developed high speed steel drills tapered to a needle point and sharpened in a manner that enables them to cut sideways as well as drill. The drills are available in four types.

**Punch**—Holes of various shapes and sizes as large as 4 in. in diameter may be made with a new Di-Acro punch now being offered by O'Neil-Irwin Mfg. Co., Lake City, Minn. This machine may also be used as a precision punch press for a variety of blanking, drawing, embossing, and forming operations. Its triangular shaped ram cannot twist or turn and assures perfect alignment.

**Temperature controller**—A temperature controller which uses a single electronic tube with an electrical resistance type bulb for thermal pick-up has been developed by the Instrument Div., Thomas A. Edison, Inc., West Orange, N. J. This type bulb permits location of the sensing element at a point remote from the control panel and eliminates the necessity of thermal compensation. Units are available to cover the temperature range from -100 to 1200° F. They may be used to control temperatures to close tolerances in solids, gases, or liquids.

**Platen presses**—A line of small, flexible, electrically heated platen presses delivering from 3600 to 20,000-lb. pressures has been introduced by James C. Heintz & Co., 3738 W. 143rd St., Cleveland, Ohio. These presses are recommended for molding small plastic electrical parts, rubber items etc. They operate on 100 to 200-lb. air pressure.

**Compression heat sealers**—Vulcan Metalcraft Ltd., 193A King St. E., Toronto, Canada, has developed 10 models of compression heat sealing machines with platen

sizes ranging from 4 by 4 in. to 18 by 28 inches. These machines may be used for heat sealing, as an applicator for electronic sealing, and for sealing plastic to cloth, drawing, forming, and embossing. Sealing, cutting and embossing may be done separately or in combination with use of single or multiple dies. The 10 models being offered are as follows: Model 4D, 4 by 4-in.

platen size, 2-in. stroke; Model 4 DT with timer, 4 by 4-in. platen, 2-in. stroke; Model 6 D, 6 by 6-in. platen, 2 $\frac{1}{2}$ -in. stroke; Model 6 DT with timer, 6 by 6-in. platen, 2 $\frac{1}{2}$ -in. stroke; Model 68 (shown here) 6 by 8-in. platen, 0 to 3 $\frac{1}{2}$ -in. stroke; Model 811, 8 by 11-in. platen, 0 to 3 $\frac{1}{2}$ -in. stroke; Model 1014, 10 by 14-in. platen, 0 to 3 $\frac{1}{2}$ -in. stroke; Model 1217, 12 by 17-in. platen, 0 to 3 $\frac{1}{2}$ -in. stroke; Model 1828, dual platens 18 by 28 in., 2 $\frac{1}{2}$ -in. stroke; a simplified high production model.

**Forming and drawing presses**—Two new presses, No. 620 RP and No. 420 RP, for the forming and draw molding of sheet plastic materials have been announced by the Indiana Foundry, Machine & Supply Co., Inc., 1400 N. Washington St., Marion, Ind. Both are equipped with a new rack and pinion installation on the movable platen and uprights to provide positive support and alignment of the movable platen. They also have double acting foot valves, pressure lubricating units, and two air speed control valves. Type 420 has a normal working pressure of 75 to 100 p.s.i., a normal capacity of  $\frac{1}{2}$  ton, a stroke up to 20 in., and a platen area of 20 by 22 inches. Type 620 has a normal working pressure of 75 to 100 p.s.i., a normal capacity of 1 ton, a stroke up to





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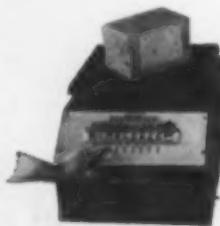
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**Hydraulic press in embossing industry**—A newcomer to the embossing industry is this 300-ton self-contained

hydraulic press made by A. B. Farquhar Co., 21 Duke St., York, Pa., and shown below installed in the plant of the Ar-Tex Embossing Co., Inc., 101 Wooster St., New York, N. Y. It can be used for embossing plastic, rubber, leather, and other coated fabrics and is said to provide extremely close tolerances. It features an automatic control which permits

pressure, stroke, temperature, and dwell adjustment; an adjustable electric timing device; positive safety with automatic shut-off and pressure control.

**Marking inks**—Two complete lines of fast drying marking inks, developed especially for color code and specification marking on plastics, rubber, leather, paper, wood, metal, ceramics, etc., have been announced by Neehi Protective Coatings Inc., 340 W. Hoffman Ave., Lindenhurst, N. Y. Both are available in a wide range of colors. One line is for automatic, semi-automatic, and manual marking devices; the other is for free hand marking, stenciling, or spraying.

**Conveyors with magnets**—Material Movement Industries, Inc., 9257 Laramie Ave., Skokie, Ill., has announced that its Tote-All bulk material conveyors are now available with an adjustable chute that removes all stray iron from bulk material being conveyed. This chute has a permanent built-in magnet and may be used with any non-metallic material.

**Coating**—The Monroe Sander Corp., 10-18 46th Ave., Long Island City, N. Y., has developed a new baking enamel especially suited for coating plastic materials such as cellulose acetate, ethyl cellulose, cellulose acetate butyrate, polystyrene, phenol-formaldehyde, and urea-formaldehyde. It is also recommended for Masonite and metal products. It is said to give a high gloss, hide blemishes and irregularities to an unusual degree, and to have unique flowing properties. The coating can be adapted to individual plant requirements either by spraying, brushing, dipping, or tumbling.

**Solenoid valve**—Model DS-2, a direct operated solenoid valve which needs no pilot or other medium for operation, has been announced by the Airmatic Valve Inc., Cleveland, Ohio. According to the company, the effective orifice area is equal to that of the pipe line and the removable resilient rubber type seat produces a leakproof seal. It can operate on A.C. or D.C. and with various fluids such as oil, water, steam, air, or freon.



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# BOOKS AND BOOKLETS

Write for these publications to the companies listed.  
Unless otherwise specified, they will be sent gratis  
to executives who request them on business stationery

**"Resins for the Paper Converter"** (Tappi Monograph Series, No. 5), by George C. Borden, Jr., and Samuel S. Gutkin.

Published by Technical Association of the Pulp and Paper Industry, 123 E. 42nd St., New York 17, N. Y., 1948. Price \$5.

Prepared by members of the Tappi Coating Committee as one of a series of monographs on various technical phases of paper making, treating, and use. The book is an excellent compilation of the properties and characteristics of the resins and modifying agents used as film formers.

**"Modern Rubber Chemistry," by Harry Barron.**

Published by D. Van Nostrand Co., Inc., 250 Fourth Ave., New York 3, N. Y., 1948. Price \$7.50. 562 pages.

Data on the chemistry and technology of natural rubber, including all the results of the intensive work done during the war and afterwards is presented in the pages of this book. Also included is the broad background of present-day rubber chemistry, based upon and including the high polymer approach that yielded such valuable results. The manufacturing data include full details of the many new methods for using natural rubber in conjunction with the various synthetic elastomers, and processing these materials to obtain new products superior in properties, lower in cost, and better in many other respects than materials and articles manufactured before the war.

**"The Electron Microscope," by Dr. D. Gabor.**

Published by Chemical Publishing Co., Inc., 26 Court St., Brooklyn 2, N. Y., 1947. Price \$4.75. 160 pages.

This book is both an introduction to the use of electron microscope and a critical contribution to its theory. Included in the book are chapters on electron wave optics, geometrical electron optics, the origin of contrast in electron microscopic images, and the possibilities of future development.

**Draftsmen supplies**—A four-page catalog, No. 48, covering time-saver templates for engineers, designers, draftsmen, and architects has been released by Rapidesign, Inc., Box 592, Glendale, Calif. Each type of template is illustrated, designated by number, and briefly described.

**A.S.T.M. Supplements**—The American Society for Testing Materials has issued five new supplements to its triennially published book of A.S.T.M. Standards. These supplements are: "Part I-A on Metals," 350 pages; "Part I-B on Nonferrous Metals," 334 pages; "Part II on Nonmetallic Materials (Constructional)," 480 pages; "Part III-A on Non-metallic Materials," 454 pages; "Part III-B on Nonmetallic Materials," 322 pages. Copies of these supplements can be obtained from A.S.T.M. Headquarters, 1916 Race St., Philadelphia 3, Pa., at \$4.00 per part; all five parts, \$20.00.

**Pumps**—A 12-page booklet, Data Sheet 67, issued by the Aldrich Pump Co., Allentown, Pa., contains complete details on the company's inverted multiplex pumps. The booklet also contains numerous illustrations, pump dimensions drawings, and pump selection charts for selecting the type and size pump required for varying operations. Included in the booklet are two sections dealing with interchangeability of parts on 6, 7, 7½ and 8 in. stroke multiplex pumps.

**Data on marketing activities**—Research Co. of America, 341 Madison Ave., New York 17, N. Y., has published its Seventh Annual Edition of "A Basic Marketing Chart of the United States." The chart answers such questions as: How has the population shifted? What changes occurred in American income? How much life insurance do Americans buy? Is the farm market important now? The basic chart also includes data on autos privately owned, total number of families, percent of families with radios, percent of families with phones, new construction activity, persons employed in manufacturing, and many other aspects vital to people engaged in marketing activities. The chart is printed on heavy paper and is 17 by 22 in.; it folds to 8½ by 11 in. for brief case or filing convenience. The chart is available for \$2.50.

**Paint, varnish, and plastic papers**—The Paint, Varnish, and Plastics Div. of the American Chemical Society has made available a booklet containing 11 papers presented before the Plastics Group and 8 papers presented before the Paint and Varnish Group as well as the papers of the Alkyd Resin Symposium and the 25th Anniversary Meeting in Chicago. Copies of this 248-page book may be obtained from the Secretary, E. E. McSweeney, Battelle Memorial Institute, Columbus 1, Ohio. Cost to non-members is \$1.50.

**Data on scientific instruments**—Amico Catalog 48, published by the American Instrument Co., Inc., Silver Springs, Md., describes numerous scientific instruments for use in chemical, biological, physical, metallurgical, engineering, and materials testing laboratories. Included in the 274-page catalog is comprehensive data on general laboratory equipment.

**FIAT reports**—A special bibliography listing 1200 reports based upon investigations and evaluations of German scientific, technical, and industrial intelligence by American investigators under the direction of the Field Information Agency, Technical (FIAT) is now available through the Office of Technical Services, Department of Commerce, Washington 25, D. C. The bibliography, PB-86000, sells for \$5. Send check or money order payable to the Treasurer of the United States.

**Productive capacity**—A paper, entitled "Measurement of Industrial Productive Capacity" and delivered by George S. Armstrong before the Industrial College of the Armed Forces at Washington, D. C., is now being offered in

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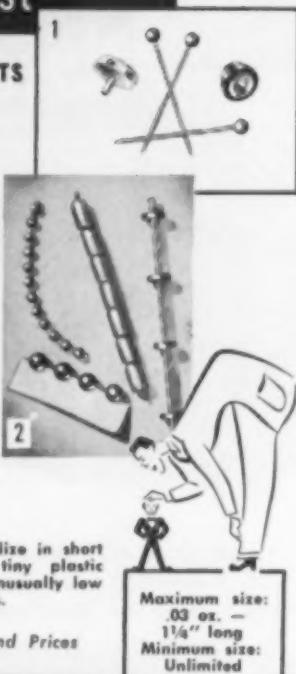
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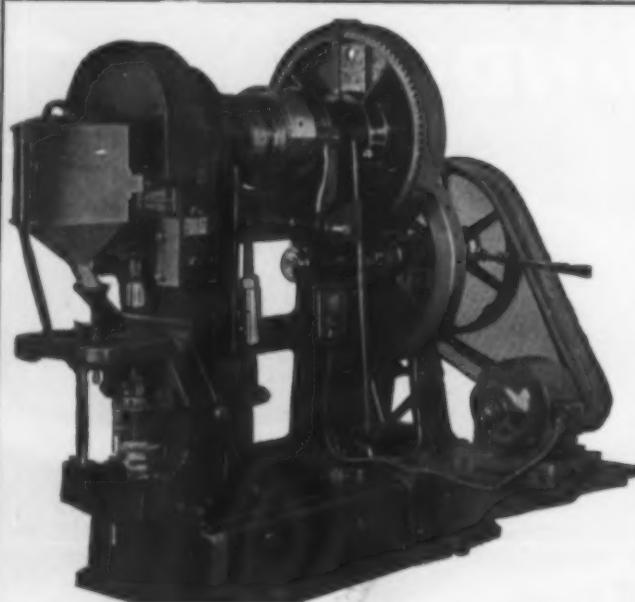
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booklet form by George S. Armstrong & Co., Inc., 52 Wall St., New York, N. Y. The various factors influencing production capacity—raw materials, power, machinery, equipment, labor, and management—are discussed and evaluated.

**Metal tubing**—"Titeflex" all-metal flexible tubing is illustrated and described in a 24-page catalog recently published by Titeflex, Inc., 655 Frelinghuysen Ave., Newark 5, N. J. In addition to Titeflex brass tubing, the catalog describes the company's new bronze tubing for nominal steam pressure applications, monel and stainless steel tubing for higher temperatures and corrosion resistance, and Inconel tubing for extremely high temperatures. Included are specifications for standard fittings and illustrations of typical assemblies with these fittings.

**Design**—A four-page, four-color, french-fold brochure, "Design Increases Sales," has been issued by Barnes & Reinecke, Inc., 230 East Ohio, Chicago, Ill. A study in the progress of industrial design is presented in a single large illustration that shows a wide assortment of products which have been designed by the company.

**Plastic tableware**—Hemco Plastics Div., The Bryant Electric Co., Bridgeport 2, Conn., has issued a 14-page booklet entitled "Hemcoware Dinnerware." The booklet pictures each of the company's products and gives their dimensions. Included is a color chart and an explanation of how to take proper care of the tableware.

**Industrial processing ovens**—A planning guide for production people concerned with heating, heat treating, baking, or curing problems has just been announced by Gehnrich & Gehnrich, Inc., 3232 57th St., Woodside, L. I., N. Y., under the title "How to Select the Right Oven for Your Process." This liberally illustrated, 32-page booklet discusses in detail the four basically different types of oven heating systems, when to use which, the different heating media, temperature and safety control, insulation, the materials handling problem, interesting ingenuities, the action of different products under heat (chemically, physically, metallurgically, structurally), and the seven basic oven and heater types.

**Report on German manufacturing methods**—An 87-page report, PB-85159, "Manufacture of Ethylene Glycol, Polyglycols, Glycol Ethers, and Related Derivatives of Ethylene Oxide in Germany" has been prepared by the late Dr. R. Max Goepp and John D. Brandner of the Atlas Powder Co., Wilmington, Del., following an investigation in Germany under OTS sponsorship. A detailed analyses of German manufacturing methods and development work on certain derivatives of ethylene oxide used in the production of explosives, detergents, softening agents, and other compounds is presented. Ten related reports are also available. Copies of the report may be obtained by writing to the Office of Technical Services, Department of Commerce, Washington 25, D. C., and should be accompanied by check or money order payable to the Treasurer of the United States. The price is \$2.25 per copy.

**Lumber products**—The Committee on Products and Research of the National Lumber Manufacturers Association, 1319 18th St., N. W., Washington 6, D. C., has issued a new and enlarged edition of the Forest Products Research Guide. This Third Edition of the Guide covers over 8000 forest products research projects, classified and referenced under more than 1000 types of research

# fabricated TUBING

● Carter has completed installation of complete fabrication facilities which further increase the many applications to industry for its large and small diameter tubing. These facilities include bending, flaring, beading, swedging and otherwise forming of Carter tubing.

Advise us your problem, and we will be glad to engineer it for you and submit samples and quotations. Besides round tubing, Carter also is a large producer of thin wall tubing in a wide range of sizes and shapes—square, oblong, oval, hexagonal and others to meet the demands of your production.

If you have an application for tubing of any kind—rigid or elastomeric—in acetate, butyrate, ethyl cellulose, vinyl or polyethylene—write to Carter and we will show you how to save valuable time and countless dollars in fabrication.



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PRODUCTS CORPORATION

Manufacturers of Extruded Plastics  
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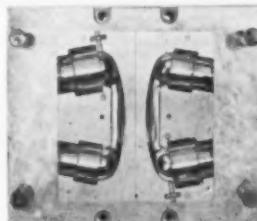
## WHAT'S WRONG WITH THIS PHONE!

Not a thing, Mister!

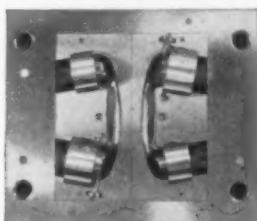
As far as we're concerned, it's *perfect*. (But if you're trying to make a call . . . sorry, it's not hooked up!)

You see, our job (here at Newark Die Company) was to machine the molds for this phone. We did the work for I. T. & T.'s Argentine subsidiary, who manufacture up-to-date equipment for the country's modern telephone system.

Specifications for this job were received in metric system—and were then translated into linear for the sake of precision. Once accomplished, skilled craftsmen at The Newark Die Company proceeded to produce a set of molds exemplary of our high-quality workmanship.



TOP HALF OF MOLD



BOTTOM HALF OF MOLD

Just tear out this coupon and mail it to us.

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Please send me a free copy of "The Procedure of Die Hobbing."

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Then you'll want to investigate *Ferro's inorganic colors*—ideally suited for compression and injection molded plastics. Select from full color range. Colors stable (to 2300 degrees Fahrenheit) and highly chemical-resistant. Write for further details and samples.

### Color Division

## FERRO ENAMEL CORPORATION

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Cleveland 5, Ohio

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work. Projects of 1400 domestic and 700 foreign agencies are included. An innovation is the addition of an index to agencies which provides a means for easily locating all of the investigations being undertaken by any one organization. The guide is available for \$5 per copy.

**Housewares**—The Associated Pot and Kettle Clubs of America, 1355 Market St., San Francisco 3, Calif., has published the 14th edition of the National Housewares Directory. The 500-page trade book, published since 1931, contains three directory sections: products; manufacturers and their representatives; and trade names. The directory is available at \$6 a copy.

**Canadian statistics**—The Dominion Bureau of Statistics, Ottawa, Canada, has released the first issue of the "Canadian Statistical Review," the aim of which is to give, in easily readable form, statistical data covering virtually the whole range of Canadian economic activities. Copies may be obtained by writing to the King's Printer, Ottawa, Ontario, Canada. Subscription price is \$3 a year or 35¢ per single copy. Remittances should be made payable to the Receiver General of Canada.

**German advances in acetylene chemistry**—The vapor phase vinyl acetate process characterized by high yields and low by-product formation is described in one of 16 recent reports on German advances in acetylene chemistry. The report, prepared by American, British and Canadian investigators, is based upon interrogations of plant officials, and examination of equipment and factory records. Copies of the 22-page report PB-80403 "Vinyl Acetate Vapor Phase Process," may be obtained for 75¢ by writing to the Office of Technical Services, Department of Commerce, Washington 25, D. C. Send check or money order payable to the Treasurer of the United States.

**Polyvinyl alcohol**—"Elvanol" Polyvinyl Alcohols" is the title of a new booklet recently announced by E. I. du Pont de Nemours & Co., Inc., Wilmington 99, Del. The polyvinyl alcohols, solid alcohols in powder form, are a series of versatile resins of proved usefulness in a great variety of industrial applications. The booklet describes the physical and chemical properties, commercial grades, uses, and applications of these resins. Major industrial uses are summarized under the general headings: adhesives and binders, textile sizing, paper sizing and coating, molded products and films, stencil screens, ceramics, temporary protective coatings, and emulsifying and thickening agents. Modifications of "Elvanol" are discussed fully as also are compatible extenders and dyes, and the physical and chemical properties of the various grades.

**Industrial survey of St. Louis**—A 24-page survey entitled "The Chemical Industry of the St. Louis Area" has been prepared by the Industrial Bureau, St. Louis Chamber of Commerce, 511 Locust St., St. Louis 1, Mo. Sections in the survey cover mineral and agricultural raw materials, histories of selected St. Louis chemical concerns, specialty products chemical companies, compounding companies, auxiliary industries, utilities and transportation, and a classified list of principal chemicals made in St. Louis.

**Solvent**—The Swan-Finch Oil Corp., RCA Building West, New York 20, N. Y., has just released an attractive four-page pamphlet on its Hydro-Solv "A", a concentrated sludge and gum solvent. Illustrations show results of its use in hydraulic systems.



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LONG ISLAND CITY, N.Y.

Accurate facilities for thousands of interesting and intricate items such as these — are combined under one roof—in a huge plant, where Accurate engineers, designers and expert craftsmen give you the benefit of their years of experience — and producing your product, according to specifications, with absolute precision and economical production costs. . . . Your Toughest Problems are invited—NO OBLIGATIONS. We specialize in small runs.



LABORATORY  
Mills & Presses



The EEMCO Laboratory Mill is entirely enclosed, ready to operate. It is equipped with built-in motor, control and variable speed drive. Mechanism readily accessible.

The 12" x 12" EEMCO 42-ton Laboratory Press is furnished with self-contained hand pumping unit, air operated fast closing, steam or electric platens, adjustable opening from 6" to 18".

Both Mill and Press are designed for research, development and small scale production.

Bulletins and additional detailed description on any EEMCO products will be sent on application . . . Early deliveries now.

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**EEMCO** — *E* — *E* — *E* — *M* — *C* —  
ERIE ENGINE & MFG. CO.

953 EAST 12th ST., ERIE, PENNA.

# PLASTICS STOCK MOLEDS\*

AUGUST 1948

A—Cabinet knob, approximately 1 1/8-in. diameter. Acetate, butyrate, ethyl cellulose, or polystyrene. Columbus Molded Plastics Corp., 1703 Keller Ave., Columbus, Ind.

B—Knob for use where torque requires a large diameter. Approximately 1 7/16-in. diameter, 11/16 in. high. Maximum shaft diameter 7/16 inch. Available with or without brass inserts and setscrews.

C—Base for mounting on instrument panel or to be used in combination with J or R. Diameter 1 1/8 in., center hole size to order.

D—Instrument control knob, 1 3/4-in. diameter, 3/4 in. high; or 1 1/2-in. diameter, 3/4 in. high. Maximum shaft diameter, 7/16 inch. Available with or without brass inserts.

E—Gas or electric range handle.  
Reg. U. S. Patent Office.

Over-all diameter approximately 2 in., height 1 inch. Fits standard shafts and can be furnished with setscrews.

F—Push button, 1 3/16 in. high, width 3/4 by 23/32 inch. Depressed panel for labels. For unit that has shafts 3/4 in. apart. Cinch spring.

G—Knob with setscrew, 1 1/16-in. diameter, 9/16 in. high. Maximum shaft diameter, 5/16 inch.

H—Diameter of knob, 1 1/16 in.; height, 9/16 inch. Maximum shaft diameter, 5/16 inch.

I—Knob with setscrew, 1 1/4-in. diameter, 21/32 in. high. Maximum shaft diameter, 5/16 inch. Can be used in combination with D.

J—Knob with setscrew, 1 1/16-in. diameter, 9/16 in. high. Maximum shaft diameter, 5/16 inch. Molded-in ring may be a contrasting color.

K—One inch diameter knob with setscrew, 9/16 in. high. Maximum shaft diameter, 5/16 inch.

L—Knob with setscrew, 13/16-in. diameter, 9/16 in. high. Shaft diameter up to 5/16 inch.

M—Acorn pointer knob, 1 1/8 in. long, 19/32 in. high; or 1 1/4 in. long, 9/16 in. high. Maximum shaft diameter 5/16 inch.

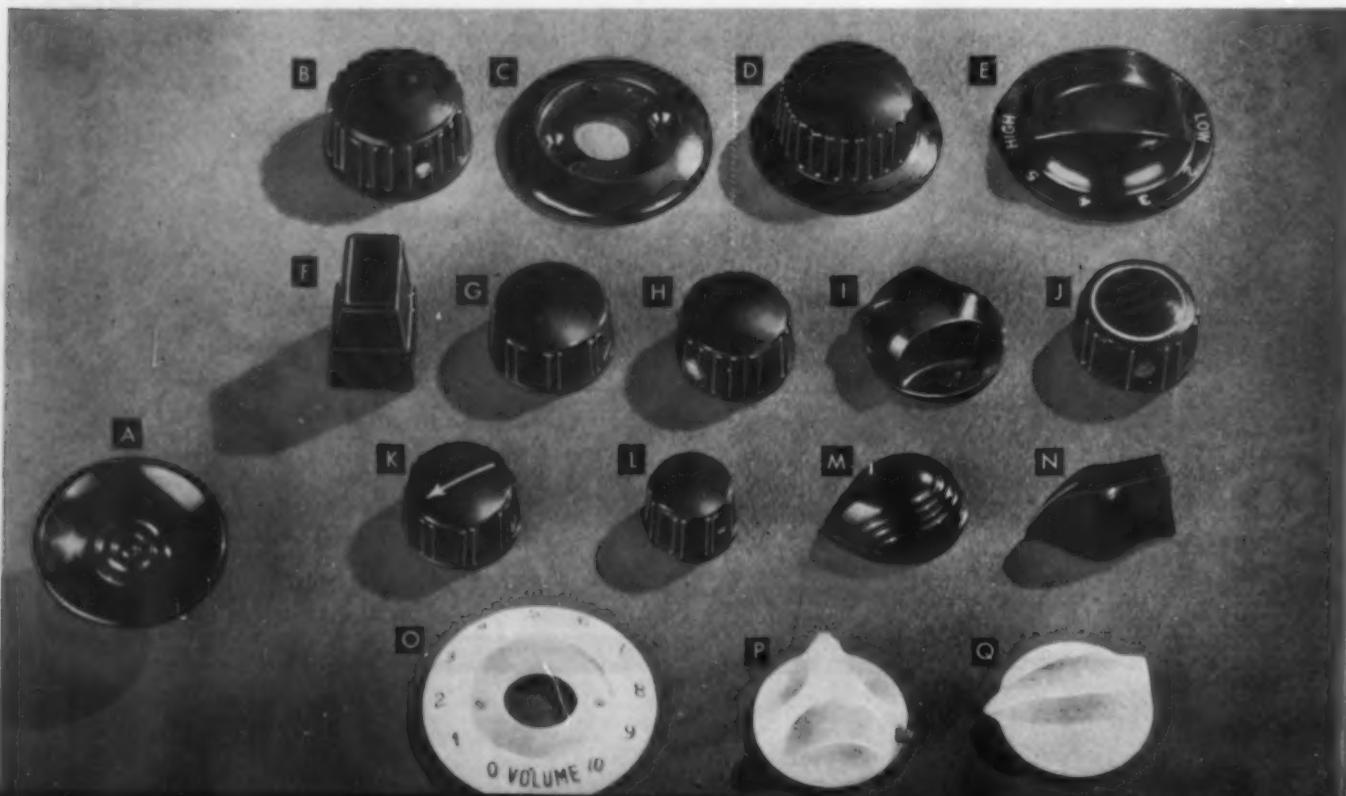
N—Pointer knob, 2 1/4 in. long, 39/64 in. high; or 1 1/4 in. long, 21/32 in. high. Furnished with or without brass inserts. Maximum shaft diameter, 7/16 inch.

O—This item is the same as D, except it illustrates how these bases may be branded.

P—Knob, 1 1/4-in. diameter, 21/32 in. high. Maximum shaft diameter 5/16 inch.

Q—Pointer knob, 1 1/4-in. diameter, 9/16 in. high. Maximum shaft diameter 5/16 inch. Can be used in combination with D.

B to Q inclusive. All knobs are molded from phenolic in black or brown, or from urea in a complete range of colors. They are readily adaptable to branding. Manufactured by Rogan Brothers, 2500 W. Irving Park Rd., Chicago 8, Illinois.



flexible  
Perforated  
fluids  
main  
Vers  
be co  
tice to  
apply



## NO METAL...

### just hard-wearing, oil-resistant PERBUNAN



**Resilient!**—absorbs shock and strain without tearing—holds its shape under stress . . . all made possible by the tough one-piece, *no metal* construction of this BETTIS DUAL Pipe Wiper of *Perbunan* rubber. *Perbunan* was chosen for its ruggedness under heavy frictional wear and extremes of heat and cold *plus* its resistance to oils, tearing, and cutting.

**New uses** for *Perbunan* are constantly being discovered in all kinds of industries . . . for flexible parts in plant machinery . . . and for the finished product itself. *Perbunan's* long-wearing qualities and resistance to rubber-destroying fluids and temperature extremes have improved products and lowered maintenance costs in many cases.

**Versatile Perbunan** is readily adaptable to complex molds. It can be compounded in varying degrees of hardness and combined with other plastics to improve their properties. For further information on the applications and compounding possibilities of *Perbunan*, please write to:



**The special rubber that resists oil, air, water, heat, cold and time**

ENJAY COMPANY, INC.  
Esso Building  
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Complete Line of  
**Machinery for Celluloid  
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NEW JERSEY

Presses for De-  
 hydrating, Fil-  
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Mixers: Plain or Stainless

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## MAPICO COLORS

WIDELY USED AND  
 HIGHLY SUCCESSFUL  
 IN PLASTICS

**The reasons are simple:**

1. MAPICO Colors are exceptionally pure chemically.
2. Use of properly balanced heat stabilizer combinations where required makes possible successful employment of MAPICO Colors in a wide range of plastics.

Suitable for textile finishes, simulated leather, upholstery, etc.

Our technical staff is at your service

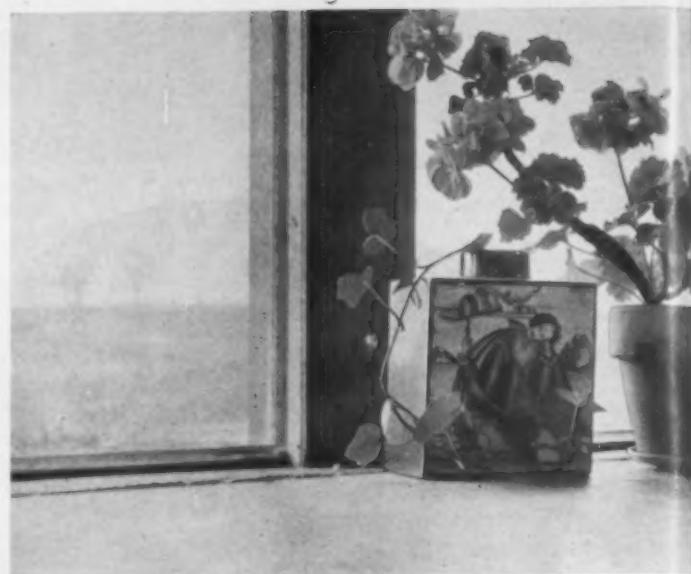
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**ADVANTAGES**  
 Rich, pleasing  
 hues. High color  
 strength. Economical; low cost,  
 high hiding. Easy  
 dispersion.

**CHARACTERISTICS**  
 Very fine particle  
 size. Light stability. Chemical  
 stability.

**YELLOWS  
 REDS  
 BROWNS  
 BLACK**



Large plate glass window rests on extruded silicone rubber gasket which gives a tight seal and withstands exposure

## Silicone Window Gasket

AMONG the houses being built in this country in record-breaking numbers are many solar houses, many ranch-style houses with wide expanses of glass, and many conventional houses which have adopted the current fad for picture windows. Surprisingly enough, the liberal use of wide expanses of glass may mean an important market for plastics.

An example of such an application of plastics is the extruded silicone rubber gasketing used to cushion large double sheets of plate glass in a solar house recently completed by architect Charles T. Masterson, Pittsfield, Mass. The gasketing is extruded of silicone rubber 12602 by the Chemical Dept., General Electric Co., Pittsfield, Mass.

Each gasket is 4 ft. long, 1 1/16 in. wide, and 1/8 in. in thickness. It supports a Thermopane window 6 1/2 ft. high and 4 ft. long, which weighs more than 160 pounds. Despite the constant pressure of the window on top of it, the gasket retains its resiliency under all weather conditions.

According to the architect, the gaskets must withstand temperatures ranging from -20 to 110° F., in addition to exposure to large amounts of snow, rain, ice, and moisture. Silicone rubber is capable of withstanding such exposure, and will not harden, crack, or rot. It also resists chemical attack, and is virtually impervious to age.

In the particular application pictured above, the material met an additional requirement. The windows are placed directly on top of the concrete foundation wall. Thus the gasket had to be resilient enough to follow slight irregularities in the concrete so as to give positive sealing.

# 3 materials you should know about...

## PLYON PF\*

New and improved post-forming laminate

### Superiorities

- (a) Doesn't crack. New resin binders move with the fabric filler.
- (b) Permits maximum draw and the forming of compound curvatures.
- (c) Has decorative as well as industrial applications. It's produced in solid colors, both translucent and opaque, and in single and multi-color patterns as well.
- (d) Obtainable in four thicknesses. Gauges are .015", .040", .060" and .070". Fillers are Fiberglas, cotton fabric or cotton in combination with other textiles.

\*Reg. U. S. Pat. Off.

## Decorative PLYON\*

Low-cost, low pressure laminate. Plywood or Masonite-backed.

### Features

- (a) Saves the waste of extra weight. You order just the thickness you need . . . either .025" (Masonite-backed) or .050" (plywood-backed).
- (b) Has many profitable uses: for surfacing drainboards, table tops, counters in stores and lunchrooms, wainscoting and the like.
- (c) Beautiful colors, attractive patterns, multiple color combinations, solid-tones.
- (d) Resists acids, alcohols, alkalis and grease. Doesn't nick or dent.
- (e) Easy to install. Comes ready to use. Just cut to shape and glue in place.

\*Reg. U. S. Pat. Off.

## Fabricated ACRYLICS

The Acrylics Fabricating Division of Swedlow Plastics specializes in the production of transparent acrylic components (plain or laminated) which must possess special optical properties and physical characteristics. These components include shields, astrodomes, aircraft canopies and noses and protective housings for machines and laboratory equipment. Swedlow engineers are ready, without charge, to consult on specific applications for fabricated acrylic components.

### MAIL THIS COUPON FOR DETAILS

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Gentlemen: Send me full particulars about

- Pylon PF, the improved post-forming laminate
- Decorative Pylon bonded to Masonite and plywood
- Swedlow-fabricated acrylics

I'm interested in these specific applications.

Name..... Position.....

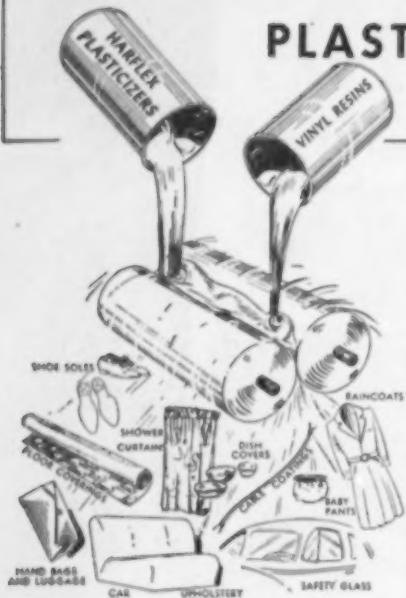
Company.....

Place.....

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Sole foreign distributor: OMNI PRODUCTS CORP.  
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# HARFLEX<sup>®</sup>

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HARCHEM offers you a complete line of Plasticizers for Vinyl Resins, Synthetic Rubbers and other Plastics and Elastomers. HARCHEM has developed a variety of Plasticizers, each with its own special combination of properties. This enables the user to select that particular product most suited to his own needs. Consult us if you have a Plasticizer problem. Our technical staff will be glad to assist you.

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CHEMICAL COMPANY INC.

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Thropp presents four newly designed laboratory mills. Some of these feature self-aligning roller bearings on the rolls, and non-leaking oil seals to prevent contamination of stock. Their use permits high temperatures for plastics. The new mills are available in a wide price and capacity range.

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**THROPP**  
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## Acetate Doilies

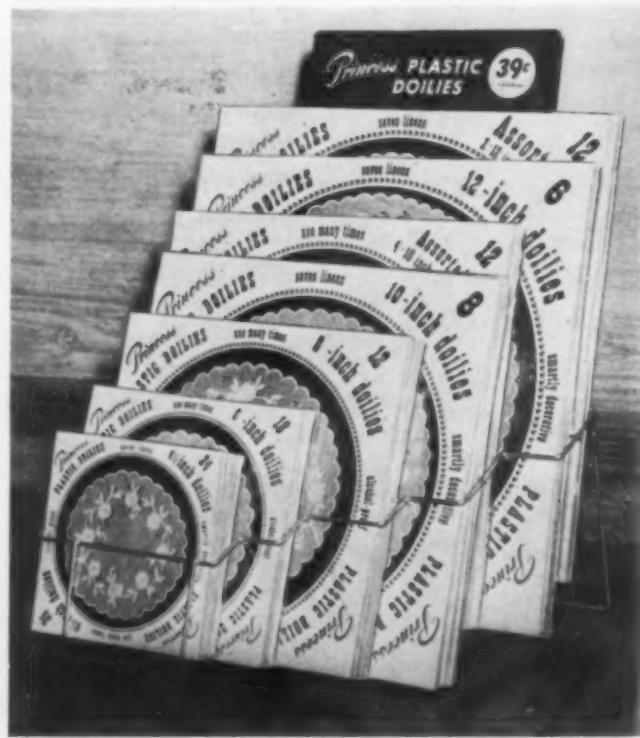
**P**LACE mats of cellulose acetate are an old story, but doilies of the same material, printed to resemble fine linen, present a new merchandising idea. The doilies, which are waterproof and alcoholproof, may easily be cleaned with a damp cloth or, because of their inexpensiveness, may be disposed of after a few uses.

Known as Princess Plastic Doilies, these printed items were designed by Liam Dunne, New York, N. Y., and manufactured by the Ullman Co., Inc., Brooklyn, N. Y. They are printed by the offset gravure method in three colors—white, yellow, and green—on Lumarith transparent film, 0.001 gage. The outside wrapping film for packages of the doilies is also cellulose acetate, 0.00088 gage.

Cellulose acetate was chosen for the doilies because it met the requirements of lying flat on surfaces, and because of its electrical properties when being printed. Other films experimented with accumulated static electricity while printing, which slowed down the production cycle. Another desirable quality in this film is that it retains its position in the window of the package without the use of adhesives.

The doilies, which are all the same price per package, with fewer doilies in each as the size increases, are 4½, 6, 8, 10 and 12 in. in diameter. Combination packages may also be obtained.

Offset gravure is used to print designs on these doilies made of 0.001 gage transparent cellulose acetate film



## IT'S EASY TO SPOT

## TWO ADVANTAGES

of having  
Norton  
as your molder

On a leading item in a leading line of kitchenware, the teakettle handle assembly shows the wisdom of having a molder who really knows materials. For the handle itself and the whistle cap we used Durez, selecting a compound with heat-resistance in addition to strength and impact properties. The trigger that prevents build-up of pressure needed strength in a very thin section, plus ability to withstand heat. For this we use Nylon.

Our other illustration shows the results Norton customers are getting in complicated molding jobs. This tabulating machine disc contains 26 stations, each with a mold-

ed-in brass insert. There are four mounting holes and a center opening for assembly. The discs come from the mold clean of flash and ready for shipment. Another example of custom molding at its best.

Why not have Norton engineer your plastics problems? We've been

consulting, and designing and producing transfer, injection and compression moldings for America's leading firms from the earliest days. For competent and prompt attention, address: Norton Laboratories, Inc., 100 Mill Street, Lockport, N.Y. Sales Agents in New York & Chicago.



THE RIGHT MATERIALS



THE BEST METHODS

**NORTON** *Laboratories, Inc.*  
SPECIALISTS IN FINE CUSTOM MOLDING

→ AVAILABLE NOW... We can help you solve design problems... and produce  
molded plastics parts or units in quantities to fit your production schedule

# FILLERS

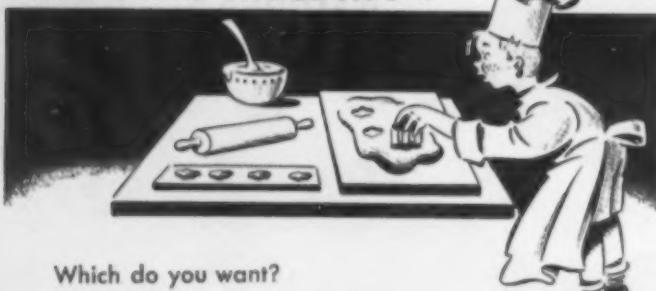
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FOR THE  
PLASTIC INDUSTRY

LARGEST DOMESTIC SUPPLIERS

BECKER, MOORE & CO., INC.

NORTH TONAWANDA, N. Y.

## COOKIE CUTTING OR PRECISION MOLDING?



Which do you want?

Precision molding requires accuracy—  
experience—engineering—high technical  
skill—complete "know how" to design  
your piece, work out your problems, produce  
your piece to your complete satisfaction.

On the other hand, cookie cutting—well!

**PLASTIC MOLDING CORPORATION**  
Custom Molders • Precision Molders  
Sandy Hook Connecticut

Cold Mold • Hot Compression • Plunger  
Transfer • Injection

## Printing on Polyethylene

In many applications, the high chemical resistance of polyethylene is a distinct advantage. But in at least one way, that same quality of the material is a disadvantage. The chemical resistance of the material makes it difficult to find inks which are suitable for printing or color engraving on polyethylene.

One company which claims to have solved the problem is the Modern Art Printing Co., New York, N. Y., a firm which specializes in color engraving and hot stamping on plastics.

The first applications of Modern Art's new process are the bottles shown on this page. The polyethylene bottles are 8-oz. stock models blow-molded by the Plax Corp., Hartford, Conn. They are used by Gene Rose, Inc., Dayton, Ohio, to package its Velva Sheen hair shampoo and its Liqua Glo Body Bath Shampoo.

### Special inks used

Modern Art marks the Velva Sheen bottle in black and the Liqua Glo bottle in gold. Directions for the use of the product are printed on the back of each bottle. All markings are debossed.

The Modern Art company has applied for a patent on the new marking method. The process is believed to be similar to the company's method of color marking other plastic materials announced late last year.<sup>1</sup> The successful application of the process to polyethylene is said to depend upon the specially formulated inks which are used.

### One or more colors possible

It is claimed that the process can be used to mark molded polyethylene products or polyethylene film in one or more colors. The debossed markings are said to have satisfactory resistance to abrasion.

<sup>1</sup> "Color marking process," MODERN PLASTICS, 25, 184 (October 1947).

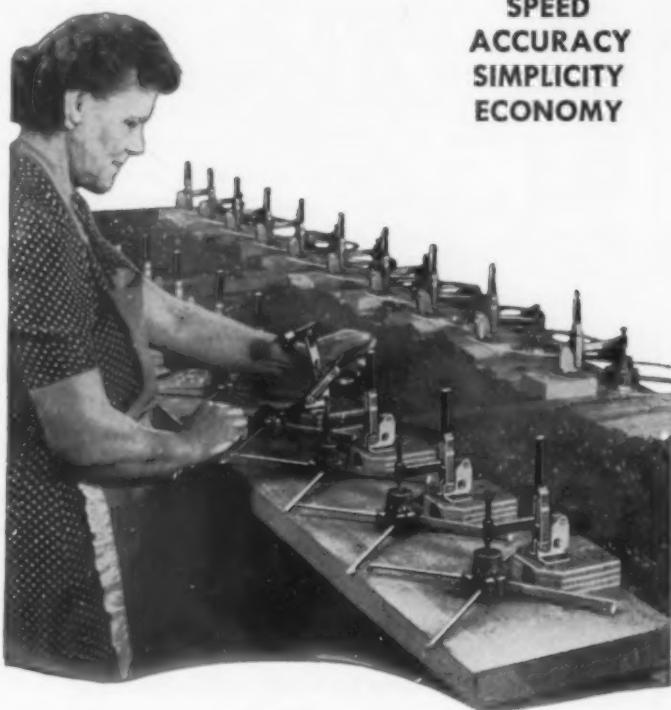
Product identification and directions for use are marked in color on polyethylene bottles. Lettering is debossed



**600 Per Hour**  
WITH

**DE-STA-CO  
TOGGLE CLAMPS**

**SPEED  
ACCURACY  
SIMPLICITY  
ECONOMY**



HELICOPTER ASSEMBLY with DE-STA-CO Toggle Clamps now stepped up to 600 per hour. Employing only four operators on this cementing bottle-neck, Stan-O-Matic Products turns out toys at the rate of over 250,000 a month. Their simple bench fixtures use series of DE-STA-CO 207-S Clamps.

BOOST YOUR VOLUME with DE-STA-CO Quick Action Clamps. Essential in many production operations such as welding, gluing, riveting or other holding jobs. For wood, plastic and metal. They're low in cost . . . high in productivity. Build your own EFFICIENT fixtures, quickly, economically!

De-Sta-Co toggle clamps are stocked by the following representatives:

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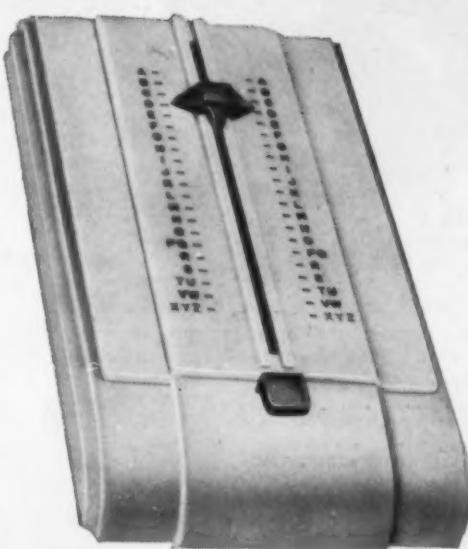


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**experience!**



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**MOLDING**

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plus  
**DIMENSIONAL STABILITY**  
(PHENOLITE CORE)  
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This product is used effectively to insulate electrical switches and equipment where high dimensional stability and arc resistance are required in proximity of current-carrying components.

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**NATIONAL VULCANIZED FIBRE CO.**  
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Offices in the Principal Cities

## British Molders' Future

THE demand for British molding powders is lessening and it is becoming clearly evident that the seller's market both in Britain and overseas is a thing of the past. Several reasons can be given to account for the decrease in orders. For the home market, the high purchase tax on many types of consumer goods which embody molded parts, such as radio cabinets and electrical, domestic, and fancy goods, has a depressing effect on sales. Another contributing cause is the Government restriction on private building which, in normal times, calls for a brisk trade in molded domestic accessories. Overseas, the difficulty of obtaining import licenses has brought an end to much profitable business and, where markets re-open, it is found that American competition is increasingly difficult to surmount.

In the thermoplastic field, American polystyrene at 2/6 per pound is able to hold a virtual monopoly of trade in moldings intended for export. The only polystyrene goods finding their way to the British market are those which have been made initially for export and whose makers have been unable to secure import licenses. To meet the present urgent need for a thermoplastic molding powder of a similar type to styrene, I.C.I. has just announced the availability of "Diakon," an acrylic molding powder. The flow properties of the acrylic powder is intermediate between those of acetate and polystyrene.

### Thermosetting powder still allocated

The supply of thermosetting powders to British molders is still allocated on a priority basis but this arrangement is not likely to continue much longer. There is a reduced demand for powder, particularly the phenolics and, with improved manufacturing facilities, the tonnage output will soon outstrip immediate requirements. By the end of the year the I.C.I. Wilton plant will be producing phenolic molding powders on a large scale.

### Certification marks

Increased publicity is being directed towards popularizing molded components. The British Plastics Federation and the British Standards Institution have agreed upon a scheme for the certification of approved moldings. The Certification Mark is in the form of a circle with the initials B.S. in the center indicating British Standard, with the initials of the Federation on the left hand side. It is intended that the Certification Mark will include code letters and numbers on the right hand side referring to the manufacturer and the relevant specification.

So far only toilet seats, sink drain boards, and certain technical moldings have been awarded marks.  
—John S. Trevor



• Our molded products are designed to combine beauty and utility, smoothing the path from manufacturer to consumer. You can count on us for an understanding of the factors that make for "buy appeal" through "eye appeal".

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These long-lasting extrusions never fray or crack. They resist wear and are not affected by acids, alcohol, petroleum products, salt water or the like. As Rextrude welting is not lacquered but solid plastic color throughout, there's no chance of the surface peeling.

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Foodstuffs  
Reagents  
Naphtha  
Soaps  
Detergents



A mold, originally designed for butyrate football helmets, is now being used to turn out polyethylene lacrosse helmets. The leather sun visor and metal face guard are riveted on

## Lacrosse Helmet

PLASTICS, which have already successfully invaded the football helmet market, are now moving in on another sport. The forerunner of the new invasion is a polyethylene lacrosse helmet molded by Cambridge Molded Plastics Co., Cambridge, Ohio, for Grebar, Inc., New York, N. Y. The helmet is assembled and marketed by Raleigh Co., New Rochelle, N. Y.

The mold used to produce the one-piece helmet was originally built to mold football helmets.<sup>1</sup> While experimenting with various materials for the football helmet, the Grebar company showed some molded of polyethylene to the athletic departments of a number of eastern colleges. The prevailing opinion was that they were too resilient to protect the wearer's head during pile-ups, and butyrate was finally chosen. But it was suggested that the polyethylene helmets could be adapted to lacrosse if protection for the wearer's face were added.

As a result, a lacrosse helmet was designed utilizing the football helmet mold. Foam rubber lining is riveted in or a felt lining is stitched in. A metal face guard with a foam rubber chin rest is riveted on, as is a leather sun visor. Ventilating holes (not considered necessary in the football helmet) are drilled after molding.

<sup>1</sup> "One-piece football helmet." MODERN PLASTICS, 25, 86 (Feb. 1948).



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MACHINERY CO.  
CLEVELAND, OHIO

# Consumption of

THE statistics given in the tabulation below represent the shipments and consumption of plastics and synthetic resins as reported by 82 manufacturing companies or company departments in the United States. Quantities which are manufactured by the reporting companies or company divisions and shipped to both domestic and foreign users

## PLASTICS AND SYNTHETIC RESIN CONSUMPTION

From Statistics Compiled by Bureau of

### Materials

Cellulose acetate and mixed ester plastics<sup>a</sup>  
Sheets

Continuous (under 0.003 gage)  
Continuous (0.003 gage and upward)  
All other sheets, rods, and tubes  
Molding and extrusion materials

Total

Nitrocellulose plastics<sup>a</sup>

Sheets  
Rods and tubes

Total

Other cellulose plastics<sup>a, b</sup>

Phenolic and other tar acid resins  
Laminating (dry basis)  
Adhesives (dry basis)  
Molding materials<sup>c</sup>  
All other, including casting (dry basis)<sup>b</sup>

Total

Urea and melamine resins

Adhesives (dry basis)  
Textile and paper treating (dry basis)  
All other, including laminating (dry basis) <sup>b, c</sup>

Total

Polystyrene<sup>b, d</sup>

Vinyl resins

Sheeting and film including safety glass sheeting<sup>b</sup>  
Textile and paper coating resins (resin content)  
Molding and extrusion materials (resin content)  
All other including adhesives (resin content)<sup>b</sup>

Total

Miscellaneous resins

Molding materials<sup>e, f</sup>  
All other (dry basis)<sup>b, f</sup>

Total

Grand Total

<sup>a</sup>Includes fillers, plasticizers, and extenders. <sup>b</sup>Excludes data for protective coating resins. <sup>c</sup>Excludes urea and melamine molding materials; see footnote <sup>e</sup>. <sup>d</sup>Dry basis, including necessary coloring materials. <sup>e</sup>Includes data for urea.

# Plastics Materials

are included in the shipment data on which these figures are based. Consumption data are limited to the quantities of plastics and resins which are manufactured and used by the 82 companies or company divisions covered by this report. Statistics are available beginning June 1945. Data for cellulose products only are available for earlier periods.

**IN POUNDS FOR MARCH AND APRIL 1948**  
**Chemical Industry Division, Chemical Unit**

March 1948	April 1948	Total for first four months—1948
lb.	lb.	lb.
483,118	676,140	2,012,053
633,821	538,134	2,360,916
236,607	354,000	1,155,184
3,960,291	3,877,403	16,032,045
5,313,837	5,445,677	21,560,198
736,448	773,371	2,750,472
262,722	297,216	1,114,555
999,170	1,070,587	3,865,017
768,754	973,525	3,140,732
3,611,012	3,397,662	13,557,972
1,928,026	1,697,513	7,154,106
19,715,665	15,416,150	70,840,028
5,339,198	5,854,231	20,857,063
30,593,901	26,365,556	112,409,169
5,200,142	4,451,024	18,431,324
1,221,908	1,422,780	6,053,271
694,366	687,476	2,788,896
7,116,416	6,561,280	27,273,491
12,717,696	12,188,506	43,514,581
7,537,151	7,467,905	28,769,774
3,053,490	2,937,881	10,507,965
6,767,151	6,725,444	28,917,217
1,679,557	2,066,646	7,228,277
19,037,349	19,197,876	75,423,233
5,397,517	5,763,187	20,889,234
3,241,796	2,456,013	11,445,575
8,639,313	8,219,200	32,334,809
85,186,426	80,022,207	319,521,230

and melamine, acrylic acid, and miscellaneous molding materials. Includes data for petroleum resins, acrylic acid ester resins, mixtures, and miscellaneous synthetic materials.



**this is *not* a quiz picture**

What you see in this picture are beads ground from plastic. We have made similar shapes from wood and fibre. We can make beads and bails from 5/64" diameter and up, in almost any color — cylindrical shapes from 3/16" diameter, and up to 7" long. We invite your inquiry.

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11% ACTIVE OXYGEN

## LOW TEMPERATURE CATALYST FOR POLYESTER RESINS

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#### REFERENCES

TRADE MARK

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Bulletin No. 8-31



ANDERSON BROS. MFG. CO., ROCKFORD, ILLINOIS



This chair is upholstered with vinyl material. It is reported that continued flexing cannot change its clear finish

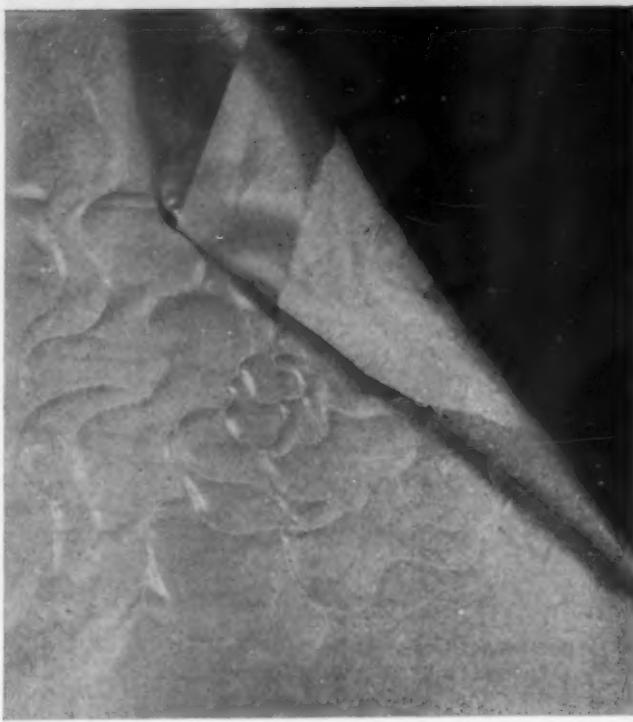
## Vinyl Upholstery

THERE are still some people who ask if a plastic upholstery material can be as good as leather. Actually, some upholstery made of vinyl sheeting is superior to leather in many respects, in that it will not crack, crease, chip, peel, or sag, and because it is impervious to moisture. In fact, original experimental sheets of one vinyl material, made eight years ago, are still in continuous use and reported to be as strong, pliable and beautiful as they were the day they were produced.

### Sheeting 0.022 to 0.023 in. thick

Boltaflex, the name given to this plastic upholstery material, produced by the Bolta Products Sales, Inc., Lawrence, Mass., is a compound of vinyl resins, plasticizers, stabilizers, and pigments. This upholstery material, the producers say, is the result of a long laboratory development period during which over 300 separate formulations were tried before it was decided that the fabric represented the optimum in strength, durability, workability, long life, flame resistance, and softness of hand.

The material is produced in a thickness of 0.022 to 0.023 inches. As a result of tests, the Bolta company believes that to produce or use a thinner plastic sheet for general furniture and upholstery use would jeopardize strength and stitch-tear resistance. On the subject of wear, this material is said to be as tough as the proverbial rhinoceros' hide. The pro-



The type of quilting shown here is called trapunto. Padding is drawn from the back to fill each part of the design

ducer reports that continued flexing will not affect the surface or change its clear finish.

#### Available in 36 colors

Furniture of any period and type may be upholstered in Boltaflex, which is available in 36 blended colors. The material is reported to be exceptionally color-fast; the pigments are impervious to moisture and cleansing agents and will not rub off on clothing. Each one of the 36 colors has been thoroughly tested in the Bolta company's laboratory. Each color must be able to withstand the equivalent of six years of normal use without fading or showing any effects of aging before it is accepted as being suitable for production. The vinyl is unaffected by perspiration, alcohol, dirt and grime, and is resistant to grease, acids and chemicals. It may easily and quickly be cleaned with soap and water.

#### Tensile strength of 2400 p.s.i.

Available in continuous rolls 54 in. in width and 30 to 60 yd. long, the upholstery material has a minimum tensile strength of 2400 p.s.i. This means that the average chair cushion covered with it will support a weight in excess of 2000 lb. before the plastic covering will be permanently stretched out of shape.

One of the applications shown in an accompanying photograph is called trapunto work, a type of quilting in which the design is outlined with single stitches and padding is drawn from the back to fill each part of the design separately and to provide a high-relief effect.

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TELL Plastic Beads are preferred by leading pearl, jewelry, novelty, toy and numerous other manufacturers from coast to coast. Expertly made from cellulose acetate material, TELL Plastic Beads are produced in a variety of spheres and shapes.

TELL Plastic Beads are available in the following colors and finishes:

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- Manufactured according to specifications.

Sizes:  $2\frac{1}{2}$  - 3 -  $3\frac{1}{2}$  - 4 -  $4\frac{1}{2}$  - 5 -  $5\frac{1}{2}$  - 6 .  
7 - 8 - 9 - 10 - 12 - 14 - 15 - 18 mms. may be ordered with or without holes. Submit your specifications or write for samples and prices.

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Oil sample placed in recess in center of back-lighted checker can be compared with two sealed-in samples of clean oil

## Motor-Oil Checker

EVERY motorist is "from Missouri" when a filling station attendant tells him that the oil in his crankcase is dirty. But even the most skeptical motorist can be shown the true condition of his oil with a simple new device fabricated of rigid translucent vinyl sheets.

The device, known as the Director, is manufactured by Wix Accessories Corp., Gastonia, N. C. It consists mainly of two rigid pieces of Vinylite, electronically bonded together, with two samples of clean oil sealed in dimples in the lower sheet. There is also a recess in the center of the device into which the attendant puts a sample of the oil to be tested.

The entire Director is mounted on a flashlight and the three samples are back-lighted. Any dirt in the sample being tested shows up clearly in comparison with the clean oil when the light is switched on.

### Vinyl resists hydrocarbons

The vinyl sheets are formed, silk screened, and assembled for Wix by Vinseal Div., Square Tool & Die Co., Inc., Chicago, Ill. Vinylite was chosen for the application because it offers the necessary resistance to the hydrocarbons in oil, and because it is able to withstand the normal rough handling which such a device is likely to get in the course of service station use.

According to the Wix company, the Director is intended to break the bottleneck in oil filter sales by showing motorists how dirty their oil actually is.

## NORTH-ERIE BALL AND PEBBLE MILLS WITH IMPROVED \*UNICENTRIC DRIVE



*Write for Data  
on complete range of sizes*



- \*NORTHALLOY steel balls and shell linings
- \*NOROCK porcelain balls and linings
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The H. W. NORTH COMPANY  
1238 Parade Street • Erie, Pa., U.S.A.

# Printed Circuits on Plastic

ONE of the essential elements in the success of the famous proximity fuse was an electric circuit printed on ceramic. This war-time development has now been adapted for commercial use in a new hearing aid—and the circuit is printed on a plastic base instead of on ceramic. This is believed to be the first such commercial application.

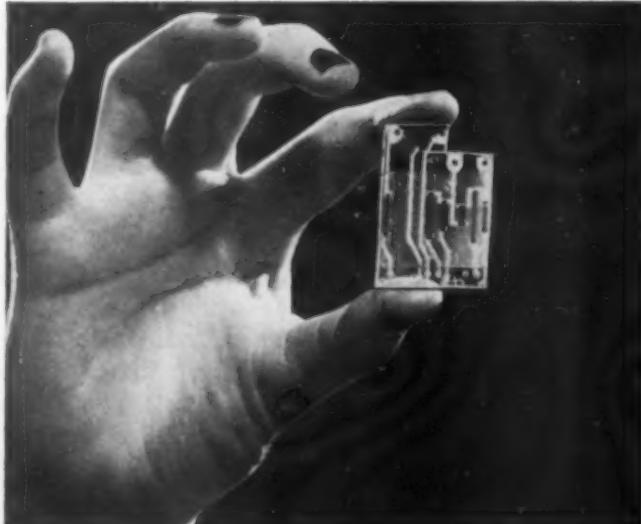
The circuit is a part of the one-piece Telex 99 hearing aid manufactured by Telex, Inc., Minneapolis, Minn. The entire circuit is printed on a piece of polystyrene  $1\frac{11}{16}$  in. long,  $1\frac{5}{32}$  in. wide, and 0.025 in. thick. The company believes that the circuit, which weighs only  $9/10$  of a gram, is the lightest ever developed.

## Advantages of polystyrene

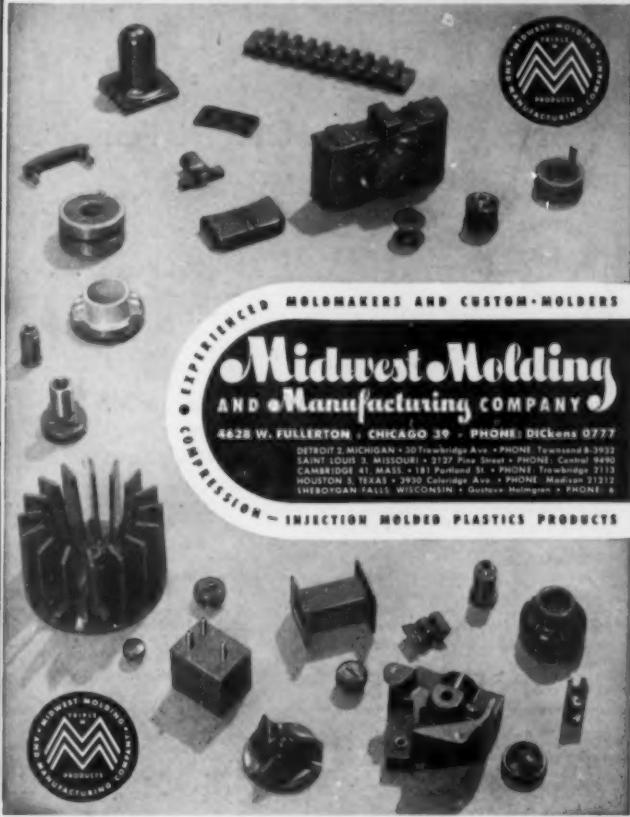
The light weight of polystyrene was one of the chief reasons for its choice for the application, because weight is of primary importance in a hearing aid. The circuit printed on plastic is also less fragile and occupies less space than circuits printed on ceramic. Imperviousness to humidity was another reason for the choice of polystyrene. The material used is Styron.

The circuit is printed on the polystyrene by a silk screening process. The silver etches into the plastic base and will not come off even if it is scraped vigorously. Resistors and conductors are also etched into the base, and the entire circuit is then hermetically sealed.

Hearing aid electric circuit is silk screened on polystyrene wafer 0.025 in. thick. Circuit weighs  $9/10$  of a gram



## CUSTOM MOLDED PLASTICS



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*Flexible*  
**METAL HOSE**  
**FOR EVERY PURPOSE**

- **SEAMLESS**—Constructed from one continuous piece of uniform thickness
- **PARALLEL CORRUGATION** assures maximum strength and flexibility •
- **SPECIAL ALLOYS** can provide either heat or acid resistance •
- **AVAILABLE** in wide variety of types to convey all kinds of liquids and gases •
- **AVAILABLE** in special assemblies to meet your special requirements.

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for information.

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**VERITRON**  
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Input energy: 8 volt amperes, 115v or 230v, 50-60 cycles — 2 and 3 wire relay systems handling maximum 3 KW non-inductive loads — All standard scale ranges available — Special ranges, voltages and frequencies to order.

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Also: Lester Injection Molding Machines; Stainless Steel Cast Mold Components



Four-part clarinet of phenol formaldehyde material can be produced at reasonable cost and with good tonal qualities

## Molded Clarinet

**H**IGH quality and low cost are factors difficult to reconcile in the musical instrument field. Yet in its new Bundy Model 1400 Resonite clarinet, H. & A. Selmer, Inc., Elkhart, Ind., has utilized a selected formulation of Bakelite phenol-formaldehyde molding material to produce an instrument which, while modest in price, has good durability and is reported to rival in tone and performance clarinets selling at a considerably higher figure.

Fine Grenadilla wood is customarily employed in quality clarinets, although metal and rubber compositions, among other materials, have been used in efforts to turn out acceptable low cost instruments.

After examining and discarding such materials as unsatisfactory, the Selmer organization began to investigate the possibilities of certain thermosetting plastics. Following joint study of the problem by Selmer and Chicago Molded Products Corp., which was commissioned to handle the job, a series of molds was made to produce the four clarinet sections required. In form and dimensions, these sections accurately duplicated those of one of Selmer's finest instruments.

Several months of test molding with various formulations and several types of fillers took place before one particular material was selected which showed outstanding properties in the completed instrument. To this Bakelite formulation, which when molded provided the desired combination of resonance and durability, Selmer applied its own trade name, Resonite, to identify the finished clarinet which offers the student of modest means a quality product whose scales, thanks to the precision molding methods employed, are always true.



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## Armed Forces

(Continued from page 79)

there were flaws. Frequently the bottom outlet where the valve is cut in would delaminate and let the water seep into the fabric. When that happened, it wouldn't be long before the entire tank came apart. The fault can no doubt be remedied by special construction but the example illustrates the need for mastering smallest details.

In addition to glass, the Engineers have experimented with nylon coated fabric but assert that its rate of elongation and ageing properties are not suitable. Glass fabric is favored because it is possible to use a thinner wall than with cotton duck, and lightness is thus achieved.

### Landing mat of glass and phenolic

Another potential is a landing mat made with a glass or magnesium skin and a phenolic paper honeycomb. It would be made in connecting panels about 20 by 5 ft. in size and up to 4 in. thick. If glass is used as the skin, contact resins could be the impregnating material. The item is not yet perfected.

In the bridge and boat section of the Engineers' Corps, there is considerable interest in plastics; what the Engineers are hopeful for is a glass mat polyester hull molded in one piece. Nylon fabric is also a possibility. The Engineers are anxious to eliminate the need for seams such as are required in aluminum. They want a strong material not susceptible to fungus, and glass mat may be the answer. The new boat hull should have a thickness of no more than  $\frac{1}{8}$  in. if possible and designed to fit the purpose—not just a copy of the old boat. It must be light enough to be hand carried. Now in existence is a \$10,000 metal mold requiring a bag pressure of 28 p.s.i. with which experiments are being conducted.

Plastics do not seem practical for pontoon boats, but an interesting related need is that for a powder to mix with water to form a rapidly setting foamed cellular structure for use in floating equipment. It would in effect trap air in bubbles so that if an inflated pontoon were pierced by bullets the air would not all leak out.

### Piping and tubing

The petroleum section of the Corps of Engineers is also interested in plastics. They are looking for light yet strong pipe about 6-in. in diameter that can be dropped from helicopters in 20-ft. lengths and can be immediately assembled in the field, with rubber gaskets between the joints. If it can be lighter than aluminum, which weighs about 3 lb. a ft., the Army would be pleased. A sample of glass pipe has withstood 2700 p.s.i. although only required to meet a 1600-lb. test—the equivalent of dropping from a helicopter. Working or bursting pressure requirement is only 600 p.s.i. However, this development is

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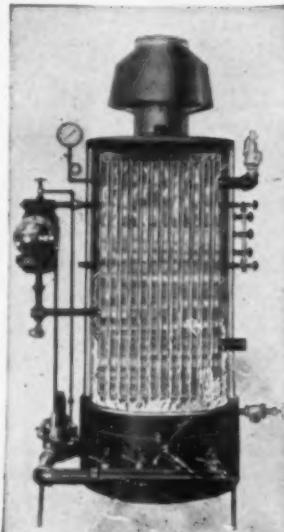
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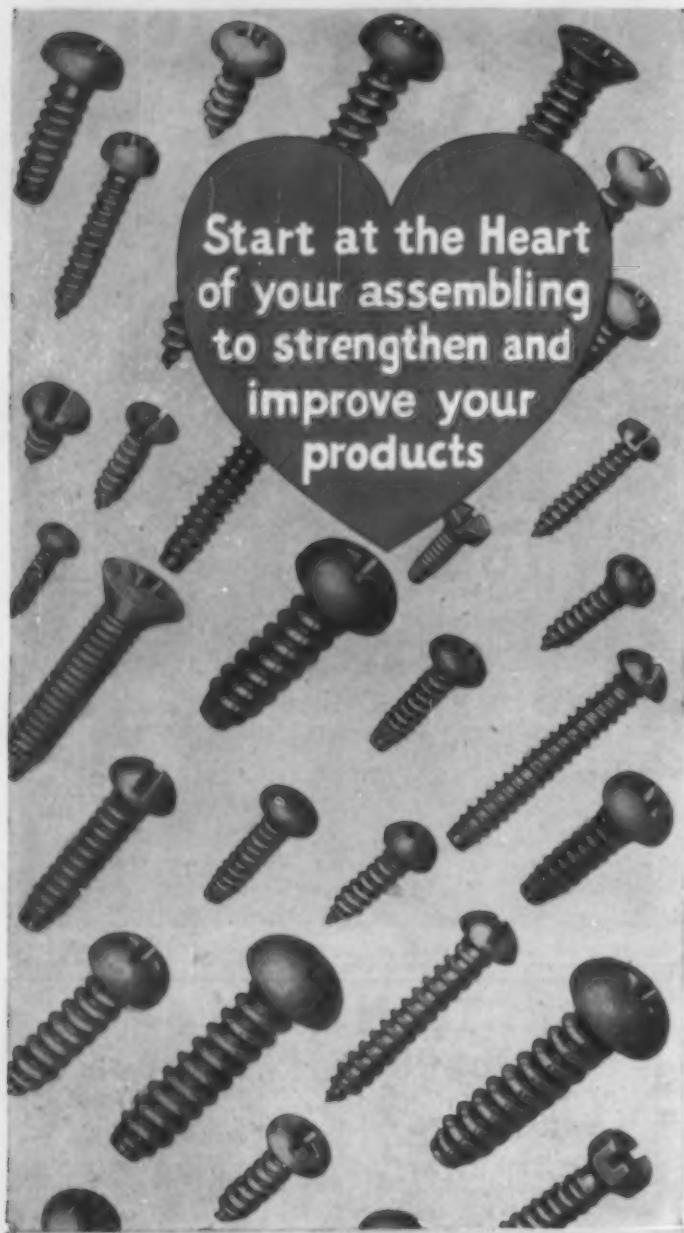
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strictly experimental; only a 2-ft. length has been tested so far, and other types, including a phenolic resin bonded plywood, are under consideration.

Incidentally, there is considerable interest in all types of plastic piping and tubing throughout the various branches of the services. One example of a highly desired item is a 3-in. diameter tube of 3½ or 4-ft. length that will withstand 400-p.s.i. exterior pressure. A glass polyester tube was submitted that had been tested at 3000-p.s.i. interior pressure but failed at 275-p.s.i. exterior pressure. An aluminum tube now in use is too heavy.

Particularly anxious to develop a low pressure laminated saltwater shipboard piping system, the Navy reports that pipes have been produced which withstand 4000 p.s.i. in ½-in. wall thickness and 3 in. outside diameter. Plastics have been found superior to 70/30 copper nickel, the most successful metal piping heretofore known. One of the big problems yet unsolved, however, has been to mold a satisfactory "T" fitting with glass-filled low pressure resins.

Still another, and what could be a sensational engineering development, is the possibility of constructing impregnated or laminated glass skin panels with glass wool or other insulation for building Army housing that would be suitable for either -70° F. temperature or for tropical climes. The modular panels would be 4 by 8 ft. and 3 in. thick, with thin skins of from 1/32 to 1/16 inch. There would be webbing between the panels to form slots which would be loaded with glass wool, thus forming a solid glass and plastic panel that could be used for partitions, floors, and roofing as well as for side walls.

Of great concern to the Engineers is plastics camouflage equipment consisting of saran, nylon, or extruded vinyl netting with vinyl film to be used in place of burlap as the disguising material. Fish netting and burlap are fire hazards; they absorb gasoline and oil and they get wet and heavy. Also, they rot. Fish net is expensive, requires fabricating or lace making machines. If plastic filaments were used, they could be simply laid over each other to form squares or diamonds and then heat sealed, thus saving fabrication costs. The Germans used vinyl film for camouflage in the last war.

#### Electrical insulation

The Bureau of Ships, Navy Dept., is another defense sector highly conscious of plastics. Among the first to foresee the advantages of glass fabric, they adopted glass melamine laminated electric insulation for shipboard use during the war. Some 4,000,000 lb. of glass melamine worth \$16,000,000 was used between May 1944 and August 1945. There has been some adverse publicity about toxicity of the material, but this was occasioned by an old report. Navy technicians now assert that laminated glass melamine is safe to use insofar as service experience has indicated. Molded glass melamine parts were never adopted by the Bureau as they were reported to

have given off a higher degree of gas than laminated parts, but a modified molding compound has been perfected that eliminates toxicity complaints. This particular molding compound is now ready for final application tests.

#### Silicone glass laminates

The Bureau of Ships is particularly interested in silicone glass laminates and molded parts for applications in high temperature electrical equipment on the new type vessels now under study. Laminates that will withstand from 392 to 482° F., according to the application, have been satisfactorily tested in equipment such as motors, generators, welders, transformers, and control coils. Walking flats—large panels over batteries in submarines so that men may walk over them—are also being considered from the standpoint of using an acid-resistant grade of glass-silicone laminate.

Silicone insulated motors operated at temperatures up to 650° C. have been tested to show that even though the motor failed due to mechanical breakdown, the insulation still maintained dielectric strength. Motors with silicone insulation can be made one quarter smaller than those formerly used. They have not yet been officially adopted in all installations because other problems, such as thermal expansion of metal parts, design of bearings, and lubricants for use at such high temperatures must be considered. But if war were to come soon, it's a good bet that thousands of silicone insulated motors would be ordered.

#### Low pressure fabricated boats and canopies

Naturally enough, one of the Bureau of Ships' greatest interests is in low pressure fabricated boats and canopies. Two contracts have been let for 28-ft. plastic boats and canopies. One contractor has produced canopies but no hulls to date due to delay in producing a cast aluminum hull mold.

The other contractor has completed three hulls and canopies. The hulls are taken from a welded sheet aluminum female mold. A low pressure polyester resin and a glass mat were chosen as the most suitable plastic material from a great many tested. It was found that the addition of one layer of cotton cloth to the surface of a glass laminate improved the abrasion resistance by eight fold. The molding operation is carried out using 30 p.s.i. pressure and 140° F. with 1½ hr. of cure time. Present work on this development is only 70% complete.

Canopies for these small boats seem to be an ideal use for low pressure plastics. The cost on a production scale is expected to be less than that of equivalent wooden canopies and the product considerably superior. Each canopy measures about 8 by 9 ft. and is 1 ft. in depth.

In addition to the 28 ft. plastic hulls, the Navy has requested bids on five 36-ft. landing craft, each with a different hull shape. These are being produced as

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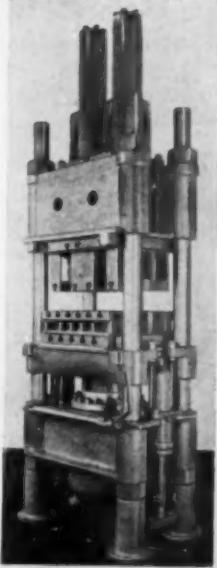
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test boats in order to study the ease of unbeaching.

If the 28-ft. hulls perform satisfactorily, plastic hulls will, in the future, be specified for many additional types of boats which are now made of wood. Navy technicians are looking forward to the day when the Bureau may decide to build a plastic hull 100-ft. PT Boat.

Biggest use for vinyls in the last war was as wire and cable covering. An airplane carrier uses as much as 1,000,000 lb. of cable. Each cable is made up of a number of wires; the total length of the wire on one carrier has been estimated at around 220 miles. A destroyer carries 80,000 lb. or about 28 miles of wire. The Navy was a pioneer in vinyl cable covering and will never go back to rubber because it burns quicker than vinyl coverings and is subject to oil damage.

Telephone and fire control cables, about half the total, are suitable at present, but improvement is sought in power cable insulation. The Navy would like a temperature resistance of 160° C.; presently used vinyl coverings go to only 120° C. Furthermore, a cable covering that will withstand flexing at -70° is desired, and it is claimed none is available at present. Neoprene will go to -40°, say researchers, but a thermoplastic is desired because of available manufacturing facilities. A thermoplastic will go to -40° but at a sacrifice of other properties. One company is working with a combination of butyl rubber and polyethylene for the job. Nylon has been experimented with but lacks high enough heat resistance. Silicone rubber has been suggested, but so far it has been developed largely for mechanical goods such as gaskets, and there has been none offered with the electrical properties needed in cable covering.

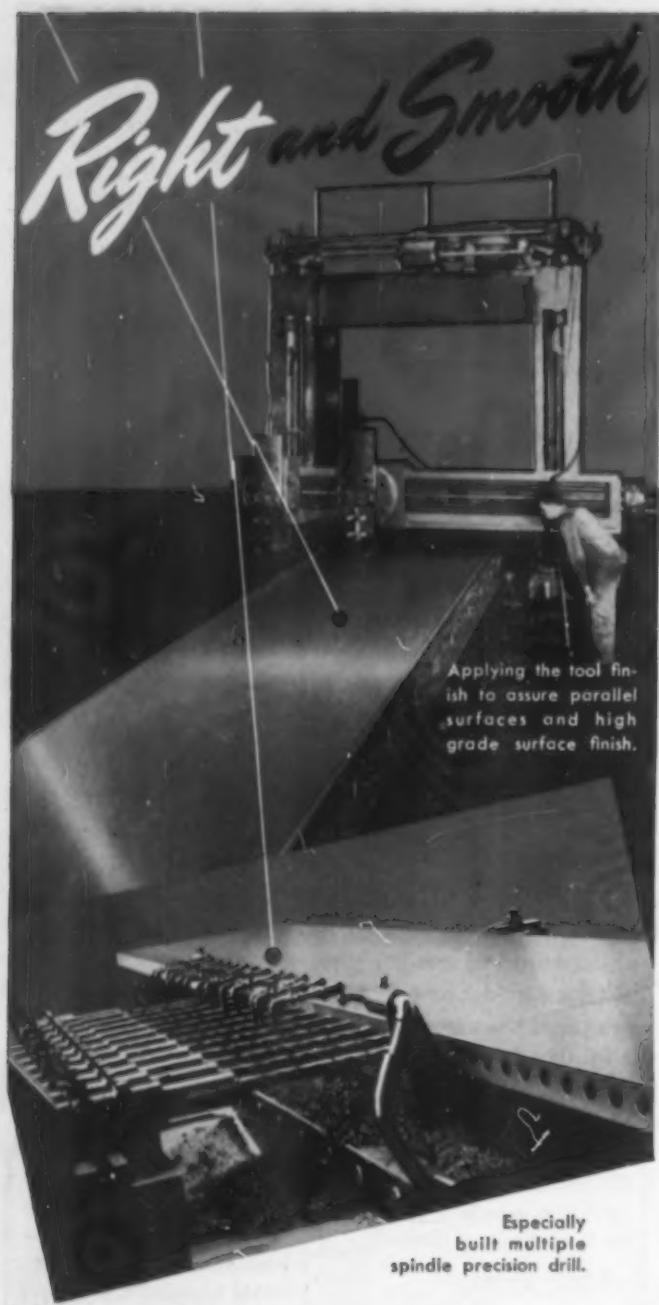
#### Housing for wide temperature range

The Quartermaster Corps of the Dept. of the Army has a great interest, like the Engineers, in housing that will withstand wide temperature extremes. Their technicians believe that laminates would replace metal to a great degree for housing if another war should come. Glass mat or bats laminated with polyester have withstood a -90° test for them; bats are preferred because there is less danger of delamination. Panels 1/32 to 1/8 in. thick are desired, but the weight of glass is a deterrent in this case, and an aluminum or magnesium skin with a phenolic paper honeycomb is being tried to overcome the weight handicap.

A flexible plastic strip, if needed between housing panels, would also be a problem. Technicians say that polyethylene and ethyl cellulose, two of the better cold resistant plastics, are not resistant enough. None of the other currently available elastomers have suitable properties for such low temperature exposure.

Vinyl and polyethylene elastomeric gun covers were exposed to low temperature work in the last war but not to the degree now asked for, and al-





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Melamine dishware for use in barracks, hospitals, and other Army institutions seems to be definitely on the way towards adoption. More than 100,000 pieces have been in use in the Pentagon cafeteria in Washington for about a year and have withstood all manner of testing. They are said to save money in replacement; are easier to handle; and have a lower bacteria count than china. Stains can be removed by bleaching. In an official test at Ft. Belvoir where the dishes are undergoing a long range survey, the Quartermaster Board has concluded that they are more acceptable to troops than either trays or chinaware; that they do not absorb heat as readily as chinaware and hence keep food hot; that they impart no taste or odor to food; that they are easier to handle because of light weight and more durable construction.

#### Body armor and helmets

The Quartermaster Corps lists their continued study on body armor and better helmets as two of their most important projects. Doron, made of glass fabric and polyester, is still in good grace, but all sorts of things, including metal and nylon, are under consideration. The big problem is to find something light and comfortable enough for a soldier or air pilot to wear with as little hindrance as possible. Helmets are desired that will give a bit more coverage to the head. A substitute for steel with good ballistic properties is sought. A better liner than the present cotton duck and phenolic with higher impact strength is desirable.

The foregoing list of plastic items on trial and needed by the Government is in no way complete. There has been no detailed mention of the plastics used in optical and miniature electrical parts by the Signal Corps; all sorts of weapon accoutrement needed by Ordnance, such as rocket parts and launchers, coatings for metal rifle butts, shell casings; anti-slip compounds used to prevent men from slipping on ship decks; plastic mixtures for sealants to be used around rivets or joints to smooth them off; a variety of packaging materials which will defy the elements; the work of Map Div. of the Army on all types of plastics to develop a relief map that would add considerable improvement to map making technique. The list could go on almost endlessly.

It is obvious that the Defense Program is important to the entire plastics industry. The number of orders to be obtained may be small and limited to a few processors, but the research and developmental work behind them could do almost as much to promote plastics technology as was accomplished under the pressure of war from 1942 through 1945. It is the patriotic duty of the industry in turn to contribute all that it possibly can to the nation's security.

Sorry!

On page 123 of the June issue of MODERN PLASTICS, Sunbeam Corp., Chicago, Ill., was inadvertently credited with molding the housing of its Shavemaster. Actually, Chicago Molded Products Corp., Chicago, Ill., molds the housing of this electric shaver for the Sunbeam Corp.

In the article "More Music," appearing on pages 108 and 109 of the June issue of MODERN PLASTICS, the Babbitt Co., Elkhart, Ind., was credited with molding acrylic reed instrument mouthpieces. These parts are, in reality, molded by Elmer E. Mills Corp., Chicago, Ill., for the Babbitt Co.

## Laminates

(Continued from page 118)

The upper bearing block provided center type loading of the specimen as a simple beam. The bearing edges of the 3 bearing blocks were rounded to a radius of 0.125 inch. The specimen width was increased to  $1.000 \pm 0.005$  in. in order to obtain greater accuracy in determining the maximum load. The span to depth ratio in all cases was at least 16 to 1. This type of specimen was similar to that specified in Federal Specification L-P-406. The load deflection data for Young's Modulus in flexure was obtained by simultaneous readings of the load and deflection. The deflection was measured in 0.001 in. with an Ames gauge mounted to record the deflection between the cross-heads.

Rockwell Hardness M was determined by the procedures specified by A.S.T.M. D785-44T.

Water absorption was determined by the method of A.S.T.M. D 570-42 in which the specimens were immersed for 24 hr. in distilled water at  $25 \pm 2^\circ$  C.

Specific gravity was determined in accordance with the method of A.S.T.M. D 792-44T, in which the loss-in-weight in water at  $25^\circ$  C. was determined on an analytical balance.

Other than allowing the machined specimens to remain several days at laboratory conditions, (temperature about  $27^\circ$  C., relative humidity 35 to 45%), they received no further conditioning prior to testing, which was done at laboratory conditions.

### Effect of specimen thickness

In order to determine the effect of specimen thickness on the strength properties of chemical cotton laminates, an initial series of test panels was prepared using a polyester resin (Thalid X-530). In one

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set of test panels, four plies of chemical cotton sheet were used which produced panels 0.145 in. thick and in another set eight plies were used resulting in panels 0.260 and 0.280 in. thick. Care was taken to keep the machine directions of the individual plies parallel to one another and this direction was designated as longitudinal.

The results of testing the strength properties of these panels which are summarized in Table I showed an exceptionally good agreement between specimens 0.145 and 0.260 in. thick. Accordingly, except as noted, all the test panels prepared for the remainder of the investigation contained five plies of chemical cotton sheet.

Test results obtained when the eight-ply panels were tested longitudinally and transversely, which are also summarized in Table I, indicated that the directional effects introduced by the Fourdrinier machine were not great enough to warrant the use of special precautions in the preparation of subsequent test panels and the fibers may be assumed to be essentially randomly oriented.

**Polyester laminates**—Laminates of cotton linters sheet with 10 commercial polyester resins were prepared and tested. The results, which are summarized in Table II, indicated that within certain limitations, the properties of the resulting laminates depended, to a great extent, on the resin used. For example, the tensile strength varied from 1250 to 6750 p.s.i., the edgewise compressive strength from 850 to 21,250 p.s.i., the flexural strength from 1100 to 13,000 p.s.i., while the stiffness (Young's Modulus) varied from 100,000 to 800,000 p.s.i. Large variations in Rockwell hardness (M16 to M39) and water absorption (0.95 to 9.85%) were also observed. It is interesting to note that relatively low water absorption with cellulose reinforced laminates was obtained with the proper choice of resin.

Selectron 5003 produced hard, firm laminates which were strong and stiff, while Selectron 5200 was representative of a resin which produced flexible and soft laminates of lower strength. Laminates from Selectron 5003 and Vibrin 132 were essentially equivalent. However, the Selectron 5003 products were stiffer than those from Vibrin 132 and had much lower values for water absorption.

**Phenol-formaldehyde laminates**—Test results for laminates prepared from six phenol-formaldehyde type resins are summarized in Table III. These data are not as complete as those for polyester resin laminates but they suffice to show that with the exception of one product (Durez 12,704) the edgewise compression and flexural strengths of the phenolic laminates were not superior to the best values for products prepared from polyester resins and cotton linters sheet. However, tensile strengths of the phenolic laminates were, in general, superior to the polyester products.

**Laminates with thermoplastic resins**—Data summarized in Table IV are not conclusive but do show

that the properties of laminates obtained from one of the thermoplastic resins (Geon 11X latex) compared favorably with those obtained with polyester and phenolic resins. This laminate, containing 68% resin, had a tensile strength of 6000 p.s.i., a Rockwell hardness of M23 and a specific gravity of 1.39.

#### Discussion

Williams, Painter and Fergason<sup>1</sup> have investigated the effect of fiber length on the properties of phenolic laminates of non-woven cotton webs. On the basis of results obtained with fibers varying from 0.50 to 1.55 in. in length, these investigators concluded that while the tensile strength of laminates was influenced by fiber length of the reinforcing material, Young's Modulus and flexural strength were unaffected. The results reported in Table III are in general agreement with the findings of these investigators although it is apparent that the flexural strength was also influenced by the fiber length in the range of fiber length of chemical cotton.

Schwartz<sup>2</sup> has investigated low pressure allyl resin laminates reinforced with canvas, eight-oz. duck, and unbleached muslin, as well as phenolic laminates reinforced with high strength paper and fine weave cotton fabrics. Since tensile strength results for allyl resin laminates reported by this investigator were only about 15% greater than values reported in Table II for laminates using Vibrin 132, it is apparent that some control of tensile strength was obtained by the proper choice of resin. However, since Schwartz obtained tensile strength values for phenolic laminates 2 to 2.7 times those obtained in Table III, it can also be concluded fiber length is important in securing high tensile strength laminates.

The general trend of these results has been confirmed by other investigators such as Caldwell<sup>3</sup>, Norelli and Gard<sup>4</sup>, Shinn<sup>5</sup>, and Howells and Lewis<sup>6</sup>.

#### Conclusion

On the basis of data presented in this report, it is recommended that the use of purified cotton linters sheet be considered as a reinforcing agent for plastic laminates when the properties summarized herein for various combinations of resin and chemical cotton meet the desired product specifications.

#### Acknowledgement

The cooperation of Messrs. W. D. Munson, W. S. Hude and E. L. Powell of the Southern Chemical Cotton Company and the assistance of Harold H. Goslen and John R. Prigmore of the Industrial Research Institute staff is gratefully appreciated.

<sup>1</sup> "Non-Woven Cotton Webs in Laminates," by Simon Williams, E. V. Painter and Carl Fergason, *MODERN PLASTICS* 24, 153 (Sept. 1946).  
<sup>2</sup> "Variation of Tensile Strength and Elongation of Plastics with Temperature," by R. T. Schwartz, *MODERN PLASTICS* 23, 183 (Sept. 1945).  
<sup>3</sup> "Properties of Laminated Phenolics," by L. E. Caldwell, *MODERN PLASTICS* 20, 82 (Aug. 1943).  
<sup>4</sup> "Effect of Temperature on Strength of Laminates," by Patrick Norelli and W. H. Gard, *Ind. Eng. Chem.* 37, 580 (1945).  
<sup>5</sup> "Impact Strength of Plastic Materials at Various Temperatures," by D. A. Shinn, *MODERN PLASTICS* 22, 145 (July 1945).  
<sup>6</sup> "Paper Base Laminates," by T. Alfred Howells and H. F. Lewis, *Ind. Eng. Chem.* 37, 264 (1945).

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# THE PLASTISCOPE\*

## PMMA meeting

MAJOR General A. C. McAuliffe, the General who spouted "Nuts!" when the Germans asked him to surrender at Bastogne, discussed plastics and their importance to the U. S. Army in a talk before the Plastic Materials Manufacturers Assn. at its recent meeting in Osterville, Mass. The General is now head of the research and development group of the General Staff of the Army. His department works under the aegis of the National Research and Development Board as an agency of the Secretary of Defense and is charged with the preparation of an integrated program of research and development for military purposes. Under the direction of General McAuliffe, the research is actually conducted by the various technical agencies—Ordnance, Signal Corps, Engineers, Quartermaster, etc. They are interested in plastics because:

1) Plastics offer replacement for other materials that become critical in wartime. 2) Their light weight is a major advantage. 3) Ease of manufacturing of some plastic items speeds production. 4) Replacement with plastics promises decreasing costs in many fields.

Among the plastic items he listed for which the Army is searching, in addition to those mentioned in the first article of this issue of MODERN PLASTICS, were a suitable adhesive for field repair of plastic coated items; a material used as a gasket which may be injected into position; a combustible cartridge case; spray applied coatings for metal parts that are not susceptible to cold embrittlement; rifle stocks and plastic coating for metal stocks; side curtains, battery sealing compounds, and exhaust system gaskets for vehicles; rigid plastic sheets and plates used as terminal plates with low dielectric loss at high frequency; optical lenses and prisms with better hardness and lower thermal coefficient of expansion.

\*U. S. Patent Office.

## INTERPRETATIONS OF THE CURRENT NEWS

By R. L. VAN BOSKIRK

sion than those plastics which are now available.

### New acrylic molding powder

A new improved, medium-flow acrylic molding powder, Plexiglas VM, has been announced by the Rohm and Haas Co., Washington Sq., Philadelphia 5, Pa. The new VM combines the sparkle and clarity of Plexiglas V with the high grade injection molding properties of Plexiglas F. The V compound was brought out about a year ago and is especially noted for its heat resistance and clarity. The older F compounds are noted for their ease

of molding but do not have such a high degree of heat resistance.

The heat resistance range of the new VM material is between 175 and 180° F., in comparison to 190 to 195° of the V compound. The new material is easier to mold, is considerably higher in heat resistance than the older F type, and is recommended for acrylic applications subjected to medium high temperatures.

It is still recommended that acrylic automobile parts be molded of Plexiglas V since temperatures inside an automobile may go as high as 175 to 180° F. when the car is exposed to hot summer sun for an extended period.

The new VM will probably supplant Plexiglas F just as soon as molders become familiar with its characteristics. There is no change in surface hardness as all types of acrylic molding powder have practically the same degree of hardness. Price of acrylic molding powder is the same for all three types.

For economy and ease of molding with Plexiglas VM, the manufacturer recommends cylinder temperatures of 400 to 420° F., with a mold temperature of 130 to 150° F. Mold designs should incorporate the general practices that have been found to give best results with acrylic powders—sprues, runners, and gates should be as large as possible to insure high production and to keep rejects to a minimum.

The comparative properties of the companion powders are given in the accompanying table.

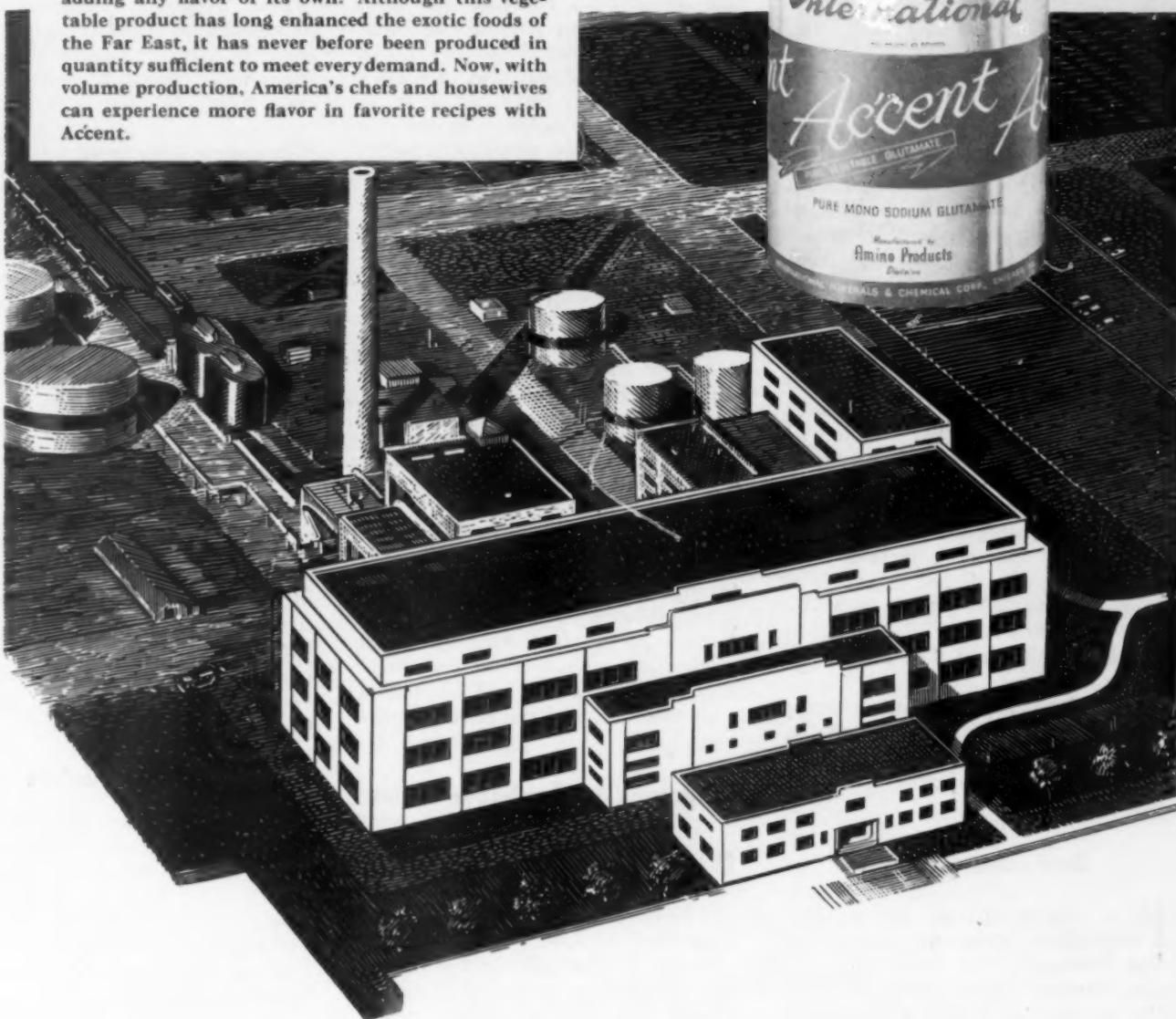
### Acrylic sheet price increase

PRICES of acrylic sheet have been increased approximately 7% by the Rohm and Haas Co., Washington Sq., Philadelphia 5, Pa., as a result of increased costs for chemical raw materials and higher wages and salaries. The company says that this is the first increase in price of Plexiglas sheet since manufacturing started 12 years ago. During the war, when the plants operated at full capacity, prices were reduced approximately 42%, and although volume has been considerably smaller since that time, prices have been kept down by improved manu-

	Average values	
	VM	V
Heat distortion temp.		
2°C/min. 264 p.s.i.		
ASTM D-648-45T	79° C (174° F.)	93° C (191° F.)
Mold shrinkage: Cold mold to cold piece-mills/in.	4-6	4-6
Compressive strength, p.s.i. ASTM D-695-42T	15,700	18,000
Tensile strength, p.s.i. (1/4-in specimen). ASTM D-638-42T	9,400	9,500
Flexural strength, p.s.i. (at break). ASTM D-650-41T	15,000	16,000
Flexural strength, p.s.i. (at max.). ASTM D-650-41T	15,300	16,000
Deflection, ins. (at break). ASTM D-650-41T	0.4	0.35
Modulus of elasticity, p.s.i. ASTM D-650-41T	400,000	425,000
Flow temperature at 1,500 p.s.i.	284±9° F	316±9° F
Impact strength—Charpy unnotched (1/2 by 1/2 in. section)	3.5	3.5
ft. lb. ASTM D-256-41T		

## Accent® on good food everywhere

Accent, pure mono sodium glutamate, has the unique ability of bringing out natural food flavors without adding any flavor of its own. Although this vegetable product has long enhanced the exotic foods of the Far East, it has never before been produced in quantity sufficient to meet every demand. Now, with volume production, America's chefs and housewives can experience more flavor in favorite recipes with Accent.



## A CCENT ON ENGINEERING

This food processing plant at San Jose, California, having the largest production capacity in the mono sodium glutamate industry, was designed and constructed by Stone & Webster Engineering Corporation for International Minerals & Chemical Corporation.



**STONE & WEBSTER ENGINEERING CORPORATION**

A SUBSIDIARY OF STONE & WEBSTER, INC.

facturing techniques and standardized production.

New basic prices now range from 80¢ to \$2.93 per sq ft., in lots of 150 sq. ft. or more, in thicknesses from 0.060 to 0.500 in.; and from \$3.71 to \$11.87 in lots of 50 sq. ft. or more for thicknesses of from 0.625 to 2 inches. In addition to standard sheet sizes, the company is offering extra large sheets of 100 by 120 in. in standard thicknesses from 0.250 to 0.750 in., which will be supplied at 20% surcharge. Optical grade thick sheet is offered in thicknesses from 0.625 to 2 in. at 10% higher prices than those above.

Clear cast rods of from 1/2 to 2 in. in diameter are offered at prices of from \$2.50 to \$1.75 per lb. in 50-lb. lots or over, with 10 ft. per lb. in the 1/2-in. size and 0.62 ft. per lb. in the 2-in. size.

Since the above announcement was received, E. I. du Pont de Nemours & Co., Inc., has also reduced the price of Lucite sheet 7% and rods 10 percent.

#### Dow sales program

**N**a follow-up on its product evaluation program announced last February, The Dow Chemical Co., Midland, Mich., held a meeting for the press in New York City late in June to tell reporters how the Dow program is working out.

The 6-point program, which includes technical evaluation, consumer testing, and revolving buyer panels, is nationally advertised by Dow, with Styron products identified so that sales inquiries are directed to the molder and merchandiser of the product.

Since consumer contacting was a new venture for the company, it has asked the press to cooperate in helping it handle that part of the program and has set up editorial panels, the first of which will meet in New York City some time in September to consider and discuss new toys. Findings of the panel will be kept in confidence.

More than 200 plastic houseware products of 72 molding companies were exhibited at the meeting, most

of them items to sell retail at between 15¢ and \$1.00.

W. R. Dixon, assistant manager of the Plastics Sales Div. of Dow, said that he expected the program to play an important part in boosting polystyrene consumption from slightly less than 100 million lb. in 1947 to more than 200 million lb. in 1949. He pointed out that in a survey of 300 major retail outlets in 35 cities, no single molder had yet obtained distribution in all 35 cities.

#### Crystal urea price increase

**T**HE price of crystal urea has been raised by E. I. du Pont de Nemours & Co., Inc., due to increased costs of production and freight, from 3 3/4¢ per lb. in carload lots to 4 1/4¢ per lb. in carload lots, f.o.b. Belle, W. Va.

#### Informative labeling committee

**T**HE S.P.I. Committee on Informative Labeling met in June under the chairmanship of Elmer French, general sales manager of Firestone Plastics Co., and made plans for the appointment of three committees to work on its problems. One will be on market research, another on standards of application and simplified nomenclature, and the third on promotion.

#### Improved ion exchange resins

**D**EVELOPMENT of versatile new ion exchange resins was announced recently at the Bridesburg, Pa., laboratories of the Resinous Products and Chemical Co.

Made of tiny plastic beads, the new resins are members of this company's family of synthetic resins known as Amberlites. Ion exchangers have a basic usage in the plastics industry itself in purifying formaldehyde, which normally contains formic acid as an impurity. They are used also to purify water in the handling of latices, where slight impurities can cause coagulation.

Outside the plastics industry, the new resins reach broadly into the food, drug, and cosmetic fields and in the chemical process industries.

Chiefly, their functions are those of separation, isolation, and purification. In other words, ion exchangers are plastic beads that perform the function of removing undesired materials and replacing them with desirables. The word ion includes both cations and anions which are the positive and negative charged particles of matter in a molecule.

Formerly, the ion exchangers operated in a limited range on the pH scale which extends in degree from 1 to 14, the lower numbers designating extreme acidity and the higher numbers signifying alkalinity.

The increased usefulness of the new resins lies in their ability to adsorb undesired ions and replace them with desirable ones in materials over the full acidity-basicity range—from pH 1 to pH 14.

In one very common use, the purification of water, the new resins allow "mixed-bed" exchange, a process long considered an idealistic dream. Thus, boiler feed water may be purified to an equivalent of distilled water by a rather inexpensive process.

#### Price reduction

**L**USTREX, Monsanto Chemical Co.'s higher heat-resistant polystyrene, has been reduced in price from 2 1/2 to 18¢ a lb., depending on quantities. The price for standard colors now ranges from 44¢ per lb. in less than 100-lb. lots to 35¢ per lb. in carload quantities. Completion of major production units, making volume quantities available, led to the price reduction, according to James R. Turnbull, general manager of sales for the Plastics Div.

#### Polyester colors

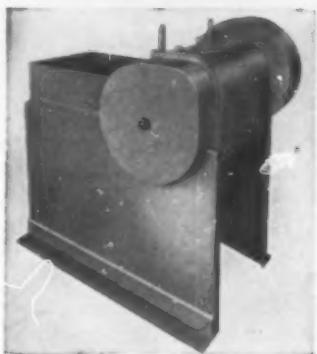
**N**INE concentrated colorants from selected pigments dispersed in a liquid vehicle compatible with their liquid type Laminac resins have been announced by the American Cyanamid Co. According to the announcement, these color pastes may be blended to obtain a wide color range; stability at room temperature is good; and dispersion in the liquid resin is easily accomplished by manual stirring.

#### All-purpose window material

**F**URTHER progress in the development of a window pane that can be used in many places where glass is now needed is indicated by a recent announcement that the Arvey Corp. 3462 N. Kimball Ave., Chicago 18, Ill., has perfected a laminate consisting of Lumite saran mesh with cellulose acetate sheeting laminated to each side. The three-layer material is transparent and not merely translucent. It is said to admit 70% of the sun's ultra-violet rays, in comparison with ordinary window glass which admits only about 1 percent. When folded, the material does not crack or break on

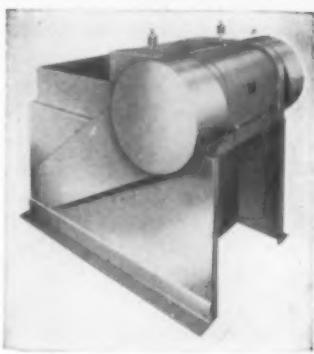
# Cumberland Machines for the Plastics Industry

**New!**



## CUMBERLAND ROTARY CHOPPING MACHINE

This machine cuts slab material from compounding mills, chops continuously extruded rods, sheets or strands, and cuts up calender roll side shear strips. This machine is also used in conjunction with extrusion machines to produce cube or pellet material suitable for a molding compound.

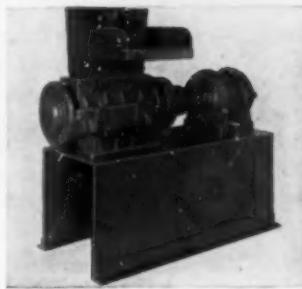
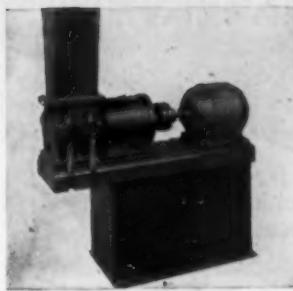


## CUMBERLAND SLITTING & MANGLING MACHINE

This machine is useful primarily to manufacturers who compound plastic materials. The machine may be used to reduce material for use as a commercial product without further granulating. Or it may be used to prepare material for subsequent final reduction in a granulating machine.

## CUMBERLAND PLASTICS GRANULATING MACHINES

These machines are designed especially for plastics. They perform with high efficiency the special cutting requirements of plastic materials. They are simple in design, rugged in construction and are easy to dismantle and clean. These machines are built in two styles. Nos. 0,  $\frac{1}{2}$  and  $1\frac{1}{2}$  as at top right (No.  $\frac{1}{2}$  is illustrated). Also, large 18" machine, double hung, with retractable knife block for complete accessibility. (Illustrated at right below.)



### REQUEST CATALOGS

Plastics Granulating Machines.....No. 200  
 Slitting and Mangling Machine.....No. 300  
 Rotary Chopping Machine.....No. 400

## CUMBERLAND ENGINEERING COMPANY, INC.

Dept. (A), Box 216, Providence, Rhode Island

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A Smart IDEA!**

Somebody had a smart idea — a continuous toaster! You merely put a slice of bread in one end and — presto! — it comes out the other end toasted! Somebody had the smart idea, too, that a plastic base would increase serviceability, improve appearance and protect table tops from heat. It did. Smartest idea of all, however, was coming to NORTHERN for the molded base. Because NORTHERN has literally grown up with plastics, knows how to use all plastic compounds, knows when to use them. If you have a smart idea, why not make it smarter with a molded plastic part by NORTHERN!

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\*Toast-O-Lator Co., Inc., Long Island City 1, N.Y.

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either side and is easy to unroll, cut, and frame.

Priced between cotton reinforced and wire reinforced material, the Arvey product, R-V-Lite, is designed particularly for use on farms and in industrial plants, in field offices and buildings, and as a heat insulator for storm windows and doors in the home. It is available in widths of 36 in. in 50 and 150 ft. rolls and is distributed through wholesalers in all sections of the country.

### Curing oven

A FUSION oven for use in curing Vinosol (organosol) coatings has been announced as a cooperative development of American Resinous Chemicals Corp., and Gehrich and Gehrich, Inc.

A convection unit has been developed with over-all dimensions of approximately 10 ft. in width, 10 ft. in height, and 17 ft. in length, accommodating a web travel of 35 feet. In general, production speeds of 10 to 30 yd. per min. can be obtained, depending upon the thickness of fabric coating to be fused. Detailed information is available from American Resinous Chemicals Corp., Peabody, Mass.

### Nylon price reduction

TWO compositions of nylon molding powder have been reduced from \$2.50 to \$2.25 per lb. by E. I. du Pont de Nemours & Co., Inc. The two compositions, FM-6503 and FM-6501, are derived from the same basic type of nylon. One was developed for solution coating of wire, fabrics, fibers, and yarns and the other for injection molding and extrusion where flexibility is desirable. Eight other compositions of nylon molding powders will not be affected by the price change.

Another price reduction of about 25% has also been announced in certain types of nylon monofilament.

**Molded bearings**—The company has also announced some interesting experiments to point out the adaptability of nylon for bearings and gears. A particular case is the use

of nylon wheel bearings in baby carriages which eliminate the need for oil. In one test, a carriage wheel was turned for the equivalent of 1190 miles with the axle in a vertical position so that the bearing was in constant contact with the axle shoulder. Bearing wear was negligible although the metal axle was slightly worn.

In another test the wheel box was loaded with sand, sealed, and revolved for the equivalent of 353 miles. The bearing showed no wear; again, the axle was slightly worn.

To determine the bearings' impact resistance, a completely assembled carriage was loaded with 100 lb. of steel rivets and rammed several times, head-on and at an angle, against a brick wall. The wheels were wrecked, bearings unharmed.

Nylon bearings are recommended for service temperatures as high as 325° F., although in many cases 325° F., although often higher temperatures can be tolerated.

**Nylon bristles**—Another recently announced nylon price reduction was in tapered nylon paint-brush bristles. Lengths of 3½ in. and under have been reduced from \$5.00 to \$3.50 a pound. The company is also introducing 2½ and 2¾ in. bristles. The price reduction and introduction of the new length bristles makes possible quantity production of nylon-bristled paint brushes of the type customarily used in the home and a more complete line of brushes for the professional painter.

Longer bristles, used chiefly in master painters' brushes, are unaffected by the new cut but are already substantially below the current price of hog bristles. The present level for bristles over 3½ in. long is \$5.00 a lb., which is just one-half the price which was established when tapered nylon paint-brush bristles were introduced in 1941.

**Nylon coated wiring**—Nylon is also being utilized by the United States Rubber Co. as a coating over the smallest electrical wire ever developed for wiring homes, offices, factories, hotels, and other buildings. The nylon forms a hard shell over the rubber insulation and gives the conductors better protection. The new wire is 30% smaller in diameter than conventional building wire of the same gage, permitting the use of more conductors in a conduit of given size.

Under the nylon are two layers of insulation—natural rubber and neoprene synthetic rubber. The ny-

lon is hot and liquid when applied over the rubber and becomes extremely hard and smooth as it cools. The new wire is claimed to be resistant to gasoline, oil, fire, moisture, acids, and light. It will be marketed under the name Neolay Type RU in 14, 12, 10, 8, and 6 gage.

### Food preservation

A SIMPLE, inexpensive way to preserve foodstuffs, introduced by Plast-O-Trete, Inc., 517 W. 57th St., New York, N. Y., a few months ago, is claimed to be superior to any other known method of preserving certain foods. The material used in the process is a dispersion of thermoplastic resins, preserving agents, and wetting agents, offered under the trade name Plast-O-Trete, for spraying, dipping, or brushing on eggs and certain fruits and vegetables to form an invisible protective film.

Dr. Joseph Winkler, chief chemist of Plast-O-Trete, Inc., and developer of the coating, describes it as non-toxic, tasteless, and odorless. It involves a coordination of low-cost thermoplastic resins which are compatible with each other and which can be dispersed in water. The plastic monomers must be polymerized to less than 0.2%, which is a specialized operation; the Plast-O-Trete Company plans eventually to make its own materials with a new method which will polymerize 100 percent.

**Bacteria-proof film**—According to Dr. Winkler, a thin, coherent film of the preservative is perfectly bonded to the egg shell or skin of the fruit or vegetable upon drying in warm air without curing. This is said to be accomplished by incorporating a minute amount of a non-toxic solvent in the dispersion, which serves to fuse the plastic particles together and produce a bacteria proof film before it evaporates.

The material is available in three forms: Type E is specifically for egg shell coating; Type F for coating foods in general which do not require a transparent and lustrous coating, such as bananas, sweet potatoes, copra, and cacao beans; and Type FL for coating foods where a luster and transparency is desirable, such as citrus fruits, apples, or avocados. Type F is also recommended for impregnating papers for wrapping fruits and vegetables with skins not adaptable to coating, such as peaches, grapes, cauliflower, etc.

Regular dyes, such as are now used on fruits like oranges, can be

# ANOTHER PROMOTION

## featuring Styron Plastic Housewares

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completely new  
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Here's a lively new Fall promotion that will prompt more and more of your customers to go shopping for housewares made of Styron (Dow Polystyrene). Be ready to supply that demand by stocking these items that have been tested by Dow's Consumer Product Evaluation Laboratory. They're eye-appealing, budget-priced and fast selling . . . they're the sales-winning items to stock for quick turn-over!



**Flower Pot**—Wik-Fed carries moisture to the plant's roots. In many of Styron's mottled colors. Molded by Kenton Engineering Company. Distributed by Mason Products Co.



**Sandwich Tray**, a versatile 14-inch tray molded of Styron. Available in a variety of soft, decorative colors. Molded and distributed by The Voges Manufacturing Co., Inc.



**Tupper Cereal Bowl** in clear, bright colors of Styron will serve many needs. Poly-T Tupper Seal Covers will fit this bowl. Molded and distributed by Tupper Corporation.



**Cooky Press**, of Styron with six assorted cooky designs. Enclosed in attractive self-display package. Molded by Makray Mfg. Co. Distributed by Popeil Brothers.



**Iced Tea Spoons**, a gay addition for summer picnics and garden parties. Molded and distributed by Mack Molding Company.



**Bird House**, a bright note in Styron for the garden. Molded and distributed by MacDonald Manufacturing Co.

### SEND FOR THIS NEW CHECK LIST

A new check list of tested Styron housewares is ready for you. Write for your copy and make your selection from the diversified array of household necessities made better with Styron, America's No. 1 plastic.

Are you sharing in Dow's big Styron promotions? **TRADE ADVERTISING LIKE THIS . . .** Direct mail . . . Point-of-sale aids . . . and . . . Full color national consumer advertising are building big markets for plastic products "Made of Styron"!

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**DOW**  
*Plastics*

# THE PLASTISCOPE

incorporated into the plastic dispersion. Type FL is also recommended for coating of wrapping tissues, such as paper, cellophane, etc., for packaging meat, fish, cheese, etc., as well as for milk and cream bottle-cap impregnation.

**Results encouraging**—Extended tests are now underway by the company; however, short-term tests are showing encouraging results. It is believed that Plast-O-Treated eggs will retain their original grade in cold storage for nine months or longer, or for a month or more at temperatures above 45° F., but not higher than 65° F.

Tests underway with Plast-O-Treated fruits and vegetables, reports Dr. Winkler, show that the coating is preventing shrinkage and mold growth over periods of two to four months. Dr. Winkler emphasizes that the Plast-O-Treated is intended only to prevent bacteria from penetrating the skin. It can prevent a great majority of uninfected eggs, fruits, or vegetables from being infected by neighboring single pieces which became infected prior to Plast-O-Treated, but it is not effective where there is already internal growth of microorganisms.

Plast-O-Treated is being manufactured at the present time in sufficiently large quantities to meet not only the demand for experimental purposes, but also for larger commercial test runs. Plast-O-Treated is available in 5-gal. containers for experimental purposes at \$5 per gal., as well as in 52/55-gal. barrels.

## Plastic reparations

SOME time ago the American-British Commission announced that the German plastics industry would be permitted to operate at its pre-war capacity and that one-quarter of this production would be allowed in payment of reparations. We have ascertained that the term "plastics industry" as used by the Office of Military Government for Germany (U.S.) includes only the production of synthetic resins and molding compounds but excludes plastics molding.

The value of production in 1936 of the industry thus defined was about 230 million Reichmarks for all of Germany, and an estimated 150 million Reichmarks for what is now the bizonal area. The 230 million Reichmarks in 1936 would equal about \$2,700,000; the 150 million Reichmarks in 1936 would equal about \$60,500,000. The reader should bear in mind that these are 1936 values and that the purchasing value today is only 60% of that total.

## Low cost urea compound

TWO additions to its plastics line have been announced by American Cyanamid Co. during the past month. One is a low-priced urea molding material, available in either black or brown, selling for 15½¢ a pound. Suggested applications for the new material include closures, buttons, and wiring devices.

At the same time, the company also announced the introduction of a new, highly translucent melamine molding compound, Melmac 404, which was developed specifically for use in the manufacture of high-gloss buttons.

Both these new molding materials are currently available in limited quantities.

## Goodrich research center

THE newly completed research center of The B. F. Goodrich Co., situated on a tract of 261 acres at Brecksville, halfway between Akron and Cleveland, Ohio, will speed development of scientific discoveries according to Dr. Howard E. Fritz, vice-president in charge of research. The site includes this large acreage partly because the company has established itself in the field of agricultural and biological chemicals and needs the space for growing crops for research.

There are now 100 chemists, chemical engineers, physicists, and engineers on the staff. In addition to work on crude and man-made rubber, the chemists will investigate such other fields as chemicals, plastics, agriculture, horticulture, and the application of nuclear energy to rubber manufacture.

## Multi-color extrusions

EXTRUSION of vinyl compounds in multi-color tapes and shapes has been announced by the Industrial Synthetics Corp., Garwood, N. J., which believes it is the first to extrude a solid color on one side

and a second solid color on the opposite side of a tape or shape. At present, the company is producing its Elastron material in a two-color tape in 3/4 and 1 in. widths in a large variety of color combinations. The material is expected to have limitless possibilities in diverse commercial and industrial fields.

## RAW MATERIALS

**Synvarite RC** is the name of an especially formulated group of rubber compounding resins available from Synvar Corp., Wilmington 99, Del., for compounding with the Buna N and Buna S type rubbers. The new resins are said to improve the mechanical properties; hardness; chemical, solvent, and heat resistance; and considerably improve the processing. They are also claimed to be helpful in improving the hardness, chemical, and heat resistance of natural rubber and Neoprene, as well as in the compounding of rubber cements.

**Santicizer 141**, a new vinyl plasticizer of the phosphate type, has been announced by the Monsanto Chemical Co., as a primary plasticizer for polyvinyl chloride and polyvinyl acetate film, sheet, or molded articles. J. K. Craver, the company's plasticizer coordinator, describes the new plasticizer as flame resistant and non-toxic with excellent low-temperature flexibility and non-toxic with excellent low-temperature flexibility and non-volatility.

**Monomeric methacrylic acid** is available in commercial quantities, according to an announcement. Rohm and Haas Co., Washington Sq., Philadelphia 5, Pa. The acid is supplied in a 40% aqueous solution having a purity of better than 96% and a polymer content of less than 0.1 per cent.

Methacrylic acid polymerizes readily to give, under most conditions, a water-soluble polymer. It may be copolymerized with other monomers to give alkali-soluble polymers. Small amounts of free acid groups in polymers are reported to improve adhesion of the polymers in some instances when used as coatings.

Samples, literature, and prices may be had by writing the company's Special Products Dept.

## COMPANY NEWS

**Gutbro Construction Co.** is featuring in its main show room on the Blvd. of the Allies at Market St.,

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RESIN IMPREGNATED PAPER AND FABRICS

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**REPRESENTATIVES:**

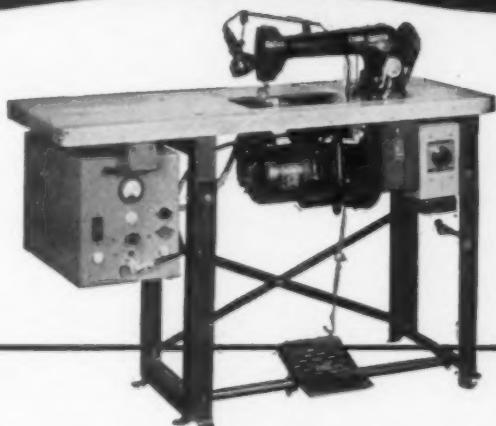
CANADA—Plastic Supply Co.

Offices in Toronto and Montreal

WEST COAST—Zellerbach Paper Co.

Divisions in Principal Cities of the West

**THE UNION SPECIAL  
 Electronic SEAMER**



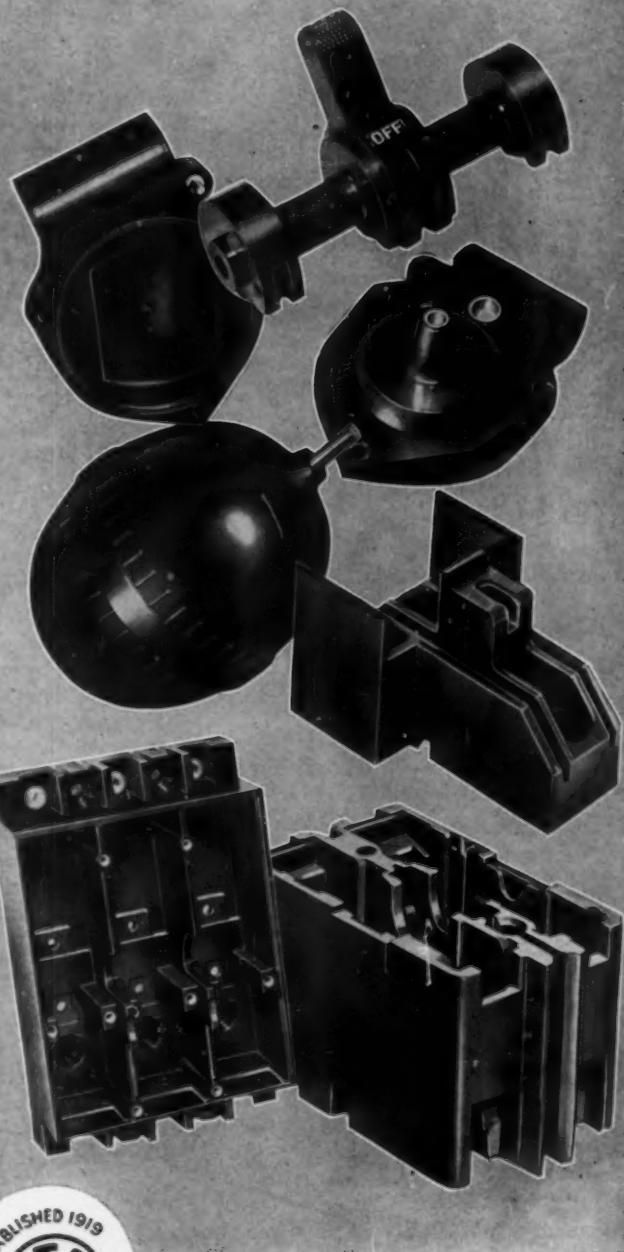
- **VERSATILITY.** Heat seals VINYLITE, KOROSEAL, VELON, WATASEAL, PLIOFILM, and other non-conducting thermoplastic films.
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# THE PLASTISCOPE

Pittsburgh, Pa., a large dealer display of the new Pittsburgh Interlocking Plastic Wall Tile made by Pittsburgh Tile Co., Baum Blvd., Pittsburgh. The entire show room is walled with the plastic tile, each wall section displaying a different tile color so that customers can select from actual installations rather than from sample pieces. The flexible display facilities include a bathroom, complete with lighting, shower curtain, and towels, and a fully equipped kitchen.

**Specialty Plastic Manufacturing Co.**, custom molders, has changed its name to Squires Plastics, Inc., at the same address, Greensburg Rd., New Kensington, Pa.

**All American Plastic Corp.**, 907 Continental Bank Bldg., Salt Lake City, Utah, was recently organized, with John R. Jones, president.

**Durez Plastics and Chemicals, Inc.**, has established a West Coast office at 3628 E. Olympic Blvd., Los Angeles 23, Calif., with Evan E. Graham in charge.

**Irvington Varnish and Insulator Co.**, Irvington, N. J., has announced the appointment of Willis J. Stillwell as vice-president. Robert E. Jones has been named vice-president and general manager of the Cap Seal Div., and John W. Apgar, who has been sales manager of the Coating Div., has been appointed assistant to the general manager of that division. Donald May succeeds Mr. Apgar as sales manager of the Coating Div.

**Tennessee Eastman Corp.**, has appointed R. H. Cannon, Jr., 360 N. Michigan Ave., Chicago, Ill., as its Chicago sales representative.

**Commonwealth Engineering Co.**, Dayton, Ohio, has announced total billings for 1947 of approximately half a million dollars for research performed under contracts which, directly or indirectly, concerned some 300 American companies.

Among the projects which the company has helped develop during

1947 are: textured vinyl films for New Wrinkle, Inc., licensor of the Wrinkle finish patents; refinement of air-drying plastics formulations; a method for binding cotton linters with resin to provide an unwoven cloth; an improved design for thermosetting molding machines; design for equipment to induce large-scale production of a new formula for cellular or sponge rubber; a determination of the relationship of oxidation, hydrogenation, and nitration of fats, waxes, and oils; an impregnated paper with the strength of fabric that may be used where cloth was previously employed.

**Inland Plastics of America, Inc.**, has announced its permanent location at 2961 Atlantic Ave., Brooklyn 8, N. Y., with facilities for handling all phases of precision fabrication in plastics products. Sales offices are at 817 Broadway, New York 3, N. Y.

Vito A. Tanzi, formerly with Steiner Manufacturing Co., has joined the firm as plant supervisor.

**Forest Products Research Society** has announced that Volume I of its Proceedings can be obtained at \$6.00 a copy. The volume incorporates the papers presented at the Society meeting held in Chicago in 1947 where Lignin Chemistry, Plastic Overlays for Veneer and Plywood, Woodworking Glues, and other items of interest to the plastics industry were discussed. The volume also includes a record of attendance at that meeting; monthly bulletins of the Society; directories of membership; and other features.

Orders should be addressed to Thomas R. C. Wilson, secretary-treasurer, Forest Products Research Society, P. O. Box 2010, University Station, Madison 5, Wis.

**Moldcraft Engineering** has moved from 1021 E. Ten Mile Rd., Royal Oak, Mich., to 66 E. Ten Mile Rd., Hazel Park, Mich.

**Lester-Phoenix, Inc.**, 2711 Church Ave., Cleveland, Ohio, manufacturers of injection molding machines for plastics, has instituted a new installation program in the Los Angeles, Calif., area and has appointed as its representative the Seaboard Machinery Co., 3212 E. Olympic Blvd., Los Angeles, Calif.

**Chicopee Manufacturing Corp.**, 40 Worth St., New York 13, N. Y., has announced that the Sea View Hotel at Miami Beach, Fla., has selected Lumite screening for all its win-

dows because of the material's salt air and corrosion resistance.

Lumite upholstery fabrics have also been installed by the Wenonah Hotel, Bay City, Mich., on its lobby chairs, divans, and—a new application—as window shades. The weather-proof window shades come in matching colors and, like the upholstery, can be easily cleaned with soapy water and a damp cloth. A further application was automobile seat covers by the Chicago Cadillac Motor Div. of General Motors Corp.

**B. F. Goodrich Chemical Co.**, Cleveland, Ohio, has announced the appointment of George B. Koch as advertising and sales promotion manager. Mr. Koch has handled publicity since joining the company in early 1946. John F. Moriarty, who formerly directed advertising production, will handle publicity; and John F. Amos will do technical writing. The new appointments are a result of H. W. Brinkerhoff, former advertising manager, and J. L. Whiteman, former sales promotion manager, leaving the firm to enter the publishing business in Cleveland.

**United States Plywood Corp.**, 55 W. 44th St., New York 18, N. Y., has changed the name of its vinyl sheeting used for wall covering and upholstery from Blanchardized Vinylite to Kalistrone.

**J. P. Seeburg Corp.** has announced the adoption of a saran honeycomb weave as a decorative grille cloth over the amplifier and speaker section of its latest music recorder. According to Seeburg technicians, the grille, manufactured from Lumite filaments, traps neither sound nor dust and is particularly suitable for sound transmission.

**M. E. Cunningham Co.**, E. Carson St., Pittsburgh, Pa., has developed a new line of interchangeable steel type, identified as S-T-M Precision Type, which is especially designed for stamping brass, aluminum, and hard rubber and, in reverse style, for stamping rubber or plastic molds. It is also applicable for plain or roll leaf heat branding of plastic or rubber products and can be furnished on any size body to suit a specific marking requirement or machine.

**E. I. du Pont de Nemours & Co., Inc.**, has announced the appointment of Ernest R. Cathcart, formerly manager of the coated fabrics plant at Fairfield, Conn., to the position of staff advisor to the com-

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 to speed  
 the day when  
 your plastic product  
 is improved.*



We are discontented with everything we make for every customer we have. We know that some day — maybe next week, next year or ten years from now — somehow, somebody will find a way to make those products better. We gain, as well as our customers, if that "somebody" is us.

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Starting with hard rubber over 60 years ago, our molding experiences now cover a wide range of natural and synthetic rubbers, thermo-setting and thermo-plastic materials, including new plastics such as Plexene M, Nylon and Lustrex.

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# THE PLASTISCOPE

pany's Fabrics Div. management. Harry J. Jenemann, former assistant manager of the Du Pont plant at Newburgh, N. Y., succeeds Mr. Cathcart as manager of the Fairfield plant, with Charles C. Quennele, former production superintendent at Newburgh, succeeding Mr. Jenemann.

## PERSONAL NEWS

**Henry Dreyfuss** has moved his New York office to 4 W. 58th St., New York 27, N. Y.

**George Harshberger** has been appointed vice-president in charge of sales for the Calresin Corp., Culver City, Calif., manufacturers of plastic coatings and flexible mold materials.

**Wayne J. Holman, Jr.**, has been named vice-president and general manager of Chicopee Sales Corp., 47 Worth St., New York 13, N. Y. He was formerly general manager of the Lumite Div. of the company and replaces Harris M. McLaughlin, who has moved to the West Coast on his retirement from active business.

**Daniel F. Kay** has been appointed general sales manager of Northeastern Plastics, Inc., 588 Commonwealth Ave., Boston 15, Mass.

**William Hart Wilson** has replaced W. L. Hardy as general manager of the Protective Coatings Corp., Belleville 9, N. J., manufacturers of case lining and preformed protective barrier bags.

**George Alexander** has been appointed assistant to the manager of the laminated plastics plant of General Electric Co. in Coshocton, Ohio. Announced at the same time was the appointment of Edward G. Gray as works engineer of the same plant.

**Alex S. Hartman**, managing director of Glassweave, Ltd., Glassweave House, 23 Old Bond St., London W1, Eng., has been in the United States for several weeks making plans to establish a glass

fibers processing plant somewhere along the East Coast.

Mr. Hartman's process for coating glass yarn or fabric with vinyl is designed to protect the glass from abrasion so that it may be used for upholstery, drapes, wall linings, head linings, and possibly in a laminate with sponge rubber to use in airplane flooring.

Glassweave, Ltd., has been doing experimental work in England for three years and has several products on the market in that country. Mr. Hartman hopes to be in operation in the United States late in 1948.

**C. H. Allin** is now representing General Industries Co., Elyria, Ohio, in the state of Michigan with his associate, E. J. Kerschen, from offices at 412 Curtis Bldg., Detroit, Mich. Mr. Allin formerly represented General Industries through the L. M. Payne Co.

**William Dunnican**, of the Chemical Div., Borden Co., has organized a Connecticut Section of the Society of Plastics Engineers, of which Milton S. Greenhalgh, General Electric Co., Bridgeport, Conn., is the first president. Other officers elected were Ernest A. Johnson, American Cyanamid Co., vice-president; Edward Seim, The Bryant Electric Co., secretary; W. C. Monahan, Monoplastics, Inc., treasurer; and Charles D'Emery, Plastic Products Co., Lewis Pentland, Durez Plastics and Chemicals, Inc., George Kaestner, Plastics Manufacturers, Inc., and William Smith, Waterbury Cos., directors.

**J. O. Reinecke**, industrial designer, has formed his own consulting organization at 720 N. Michigan Ave., Chicago 11, Ill.

**Robert D. Wise** has been appointed industrial sales manager of The Drackett Products Co., Cincinnati, Ohio. Ben Bain continues as manager of the company's plastics division.

**Eleanor Fisher Horsey** has joined the Chemicals Div. of The Glenn L. Martin Co., with headquarters in Baltimore, Md. She was associated with Hercules Powder Co. from 1942 and was previously with the Borden Co.

**A. N. Williams** has been promoted to general sales manager, Plastics Div., General American Transportation Corp., 135 South LaSalle St., Chicago 90, Ill.

**John C. Chamberlain** has transferred from the production control section of the Plastics Sales Div., Dow Chemical Co., Midland, Mich., to the company's St. Louis, Mo., office and will handle plastics molding powder sales.

**Robert M. Gubbins**, who was formerly in charge of the Plastics Div. of A. C. Spark Plug Div., General Motors Corp., Flint, Mich., has been appointed plant superintendent of G. Felsenfeld and Sons, Inc., Chicago, Ill.

**John A. Buckley** has been appointed assistant sales manager in charge of laminated products for the General Electric Co.'s Plastics Division.

**G. Theodore Barks** has been appointed general superintendent of Monsanto Chemical Co., new vinyl chloride production unit.

**Ferris E. Newman** has been appointed head of Plastics Development at the Fort Wayne, Ind., plant of the United States Rubber Co.

**J. L. Williams** has been named laboratory director of the Styron Control and Development Laboratory at The Dow Chemical Co., Midland, Mich. He has been with Dow since 1933. R. E. Peterson was appointed assistant laboratory director.

**L. J. Morrison**, vice-president in charge of sales of the Detroit Mold Engineering Co., 6686 E. McNichols Rd., Detroit, Mich., has been assigned additional executive duties and named a member of the company's Board of Directors.

## MEETINGS

**August 16-17**—The Plastics Committee of the Technical Association of the Pulp and Paper Industry will sponsor a two-day conference at the Institute of Paper Chemistry, Appleton, Wis.

**Sept. 27-Oct. 1**—Third National Plastics Exposition, Grand Central Palace, New York, N. Y.

**Oct. 12-16**—Fifth National Chemical Exposition, sponsored by the Chicago Section of the American Chemical Society, Chicago Coliseum, Chicago, Ill. The feature exhibit, "Chemical Trail Blazers," will show the latest discoveries and future ideas, applications, and developments in the industrial chemical field.

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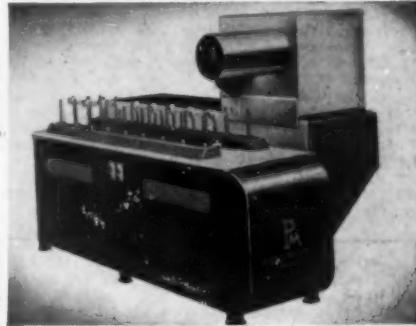
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For further information address Classified Advertising Dept., MODERN PLASTICS, 122 East 42nd St., New York 17, N. Y.

**FOR SALE** Hydro Pneumatic Accumulator, 13 Gal. 3500psi. Ball & Jewell Rotary Cutter, Model R and "T" Stokes Tablet Machines. 50 Ton Press with 18" x 18" Electric Plates. 100 ton 20" x 20" press. Racine Pumps, Boosters, Valves, Logan Pumps, Valves, Self-Contained—200 H.P. 78 Gal. 3000psi Pump. 200 H.P. 200 Gal. 1500psi Pump 18" x 15". Accumulator 1500psi—15" x 11" Acc. 400-2000". 6" x 9" Accumulator—2000psi. 300 Ton Press 20" Ram, 8" Stroke, 24" x 20" Platen. 500 Ton—1000 Ton Hobbing Press—Help Shaw Variable Pressure 23 GPM 2500psi—Vickers Oil Pumps 17 GPM 500 to 1000psi. Elmes Horo. 4 Plunger 6-Gals. 5000psi. Stillman 12" x 12" Laboratory Presses. Aaron Machinery Co., 45 Crosby St., NYC.

**WANTED: PLASTIC Scrap or Rejects** in any form. Cellulose Acetate, Butyrate, Polystyrene, Acrylic, Vinyl Resin, etc. Also wanted surplus lots of phenolic and urea molding materials. Custom grinding and magnetizing. Reply Box 318, Modern Plastics.

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**FOR SALE—1—Watson Stillman Hydro-Pneumatic High and Low Pressure System, complete, 3000psi; 12—Baker Perkins 100 gallon Plastic Mixers; 1—12" x 12" Press 7" Ram, Steel Heated Platens and Hand Pump attached; 2—21" x 24" Adamson, 10" ram, 2-opening Hydraulic Press; 2—La Pointe Hydraulic Pumps, 150 G.P.M.—2000 lb. pressure direct motor driven to 125 HP AC motor; 1—French Oil Hydro-pneumatic Accumulator; 1—14" x 24" Press, 9" ram; 2—Royale 22 1/2" Perfected Tubers; 1—Royale 22 1/2" Perfected Tuber; 1—16" x 42" Thropp Mill; 2—B & J 22" Rotary Cutters; 1—Cavagnaro 2 cylinder 10" diameter Vertical Hydraulic Extruder; 1—Devine 22" Vacuum Shelf Dryer, 17 shelves heated 40" x 42"; 1—Farrell 6" x 12" 2-roll Rubber Mill; 1—48" x 48" 3-opening Hydraulic Press, 4—10" diameter rams, 300 tons; Dry Powder Mixers; Pulverizers; Grinders; etc. Send for complete list. Box C581, Modern Plastics.**

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(Continued on page 188)

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(Continued from page 186)

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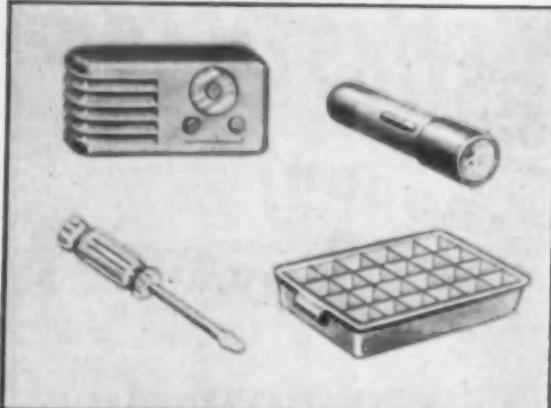
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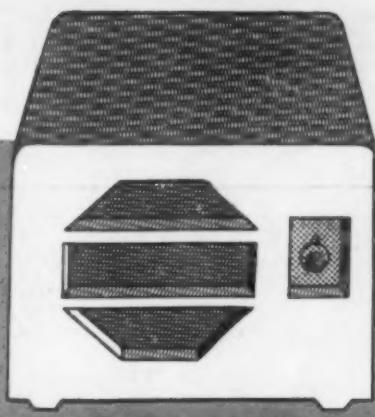
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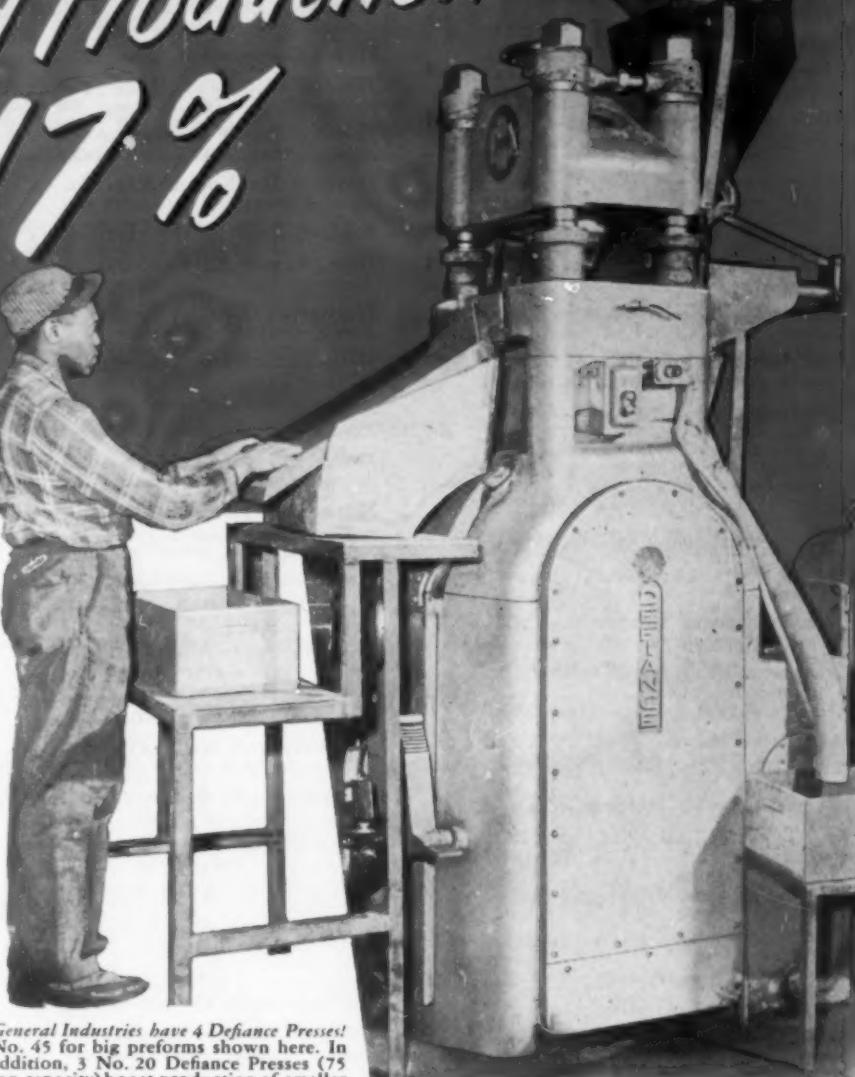
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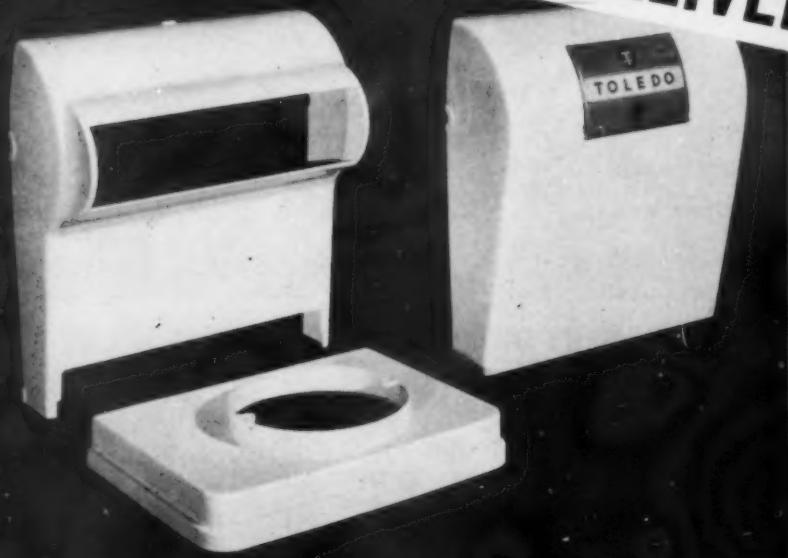
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122 EAST 42nd STREET

NEW YORK 17, N. Y.

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